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Attitudes of residents toward wolves in a rural community in northwestern Montana

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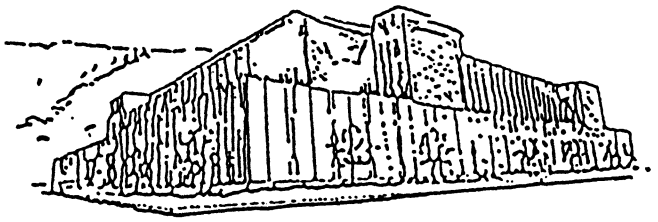

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ATTITUDES OF RESIDENTS TOWARD WOLVES IN A RURAL COMMUNITY IN NORTHWESTERN MONTANA

by

Rachel C. Wolstenholme

presented in partial fulfillment of the requirements

for the degree of

Master of Science

The University of Montana

1996

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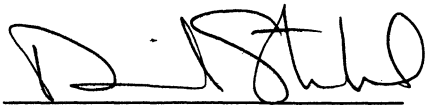
Chairperson



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Attitudes of Residents Toward Wolves in a Rural Community in Northwestern Montana (101 pp.)

Committee Chairperson: William Chaloupka

Because human-caused wolf mortality is a limit to natural wolf recovery in the West, understanding the attitudes of residents within wolf range could allow wildlife managers to promote greater tolerance of wolves through management policies. A mail survey was sent to residents of the Ninemile Valley, Missoula County, Montana to investigate the attitudes of residents within wolf range. Respondents were questioned about their attitudes toward wolves and wolf management policies. Most respondents were supportive of continued wolf presence in the valley. Respondents' gender, education, and number of years of residency in Ninemile were related to their attitudes. Livestock producers were among the respondents who were un-supportive. Hunters were also less supportive than in other studies. The main reason some respondents were not supportive of wolves was a perceived decline in game numbers. Two policies were perceived by approximately one third of the respondents as promoting local residents' tolerance of wolves: a livestock depredation reimbursement fund and biologists conducting research on wolves locally. Most respondents did not report a change in their attitudes toward wolves over time. However, management policies have potential to impact peoples' attitudes either positively or negatively. Management recommendations based on peoples' attitudes are: minimize land use restrictions related to wolf recovery, establish and maintain communication between wildlife managers and local residents, guarantee a compensation fund for wolf-caused livestock depredation, research wolves' impact on local game populations, promote long term education in schools on wolves and ecology, and create a flexible wolf control policy that can both, address residents' concerns and achieve wolf recovery goals.

ACKNOWLEDGEMENTS

First, I would like to thank all residents of the Ninemile Valley who participated in this project and shared their thoughts on wolves with me. I would also like to thank my committee: Bill Chaloupka, the committee chairperson, for his strong support; Len Broberg, for his excellent editing advise; Bob Ream, for his continued support and insight; and Mike Jimenez, for editing assistance and for introducing me to the Ninemile Valley in the first place. I also want to thank my friends and family for all their suggestions, support, and enthusiasm. I owe many thanks to Dennis and Chuck, two Sociology statisticians who patiently lead me through the analysis of my data; to Professors Becky Richards and Dan Pletscher, who withstood my endless questions; and to all the people who assisted in the review of the survey questionnaire. Finally, I'd like to acknowledge and thank Nic Evans, the Environmental Studies Program, The Alliance for the Wild Rockies, and Defenders of Wildlife for funding assistance.

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INTRODUCTION

The survival of a species depends on factors ranging from natural extinction, to habitat loss, to direct human-caused mortality. It was human-caused wolf mortality during the late 1800's and early 1900's which eliminated wolf populations and resulted in their designation as an endangered species in the lower forty-eight states, except in Minnesota where they are listed as threatened (Mech 1970). Thousands of wolves were killed by humans so by the 1930's wolves were extirpated in most of their range in the contiguous U. S., Figure 1 (McIntyre 1995; Bangs and Fritts 1996). Today, human-caused mortality remains a concern and a potential limiting factor for wolf recovery taking place in the western states of the U. S. [U. S. Fish and Wildlife Service (USFWS) 1987].

CONTROVERSY OVER WOLF RECOVERY

While debate over the natural recovery and reintroduction of wolves in the Western United States has been extensive, natural recovery has taken place in some regions. Within the past several decades, observations of wolves in Montana have increased in number (Ream and Mattson 1982; Ream et al. 1986) and packs are now established in at least eight areas in the state (USFWS 1995). In January of 1995 and 1996 the U.S. Fish and Wildlife Service reintroduced wolves to Central Idaho and Yellowstone National Park (Bangs

Figure 1.

Distribution of the wolf in North America, past and present (McIntyre 1995)

and Fritts 1996). The recovery of natural or reintroduced wolf populations, however, "cannot succeed without public support and acceptance" (USFWS 1987).

Today, with many peoples' awareness of ecology and appreciation of wildlife, most Americans believe that wolves have a natural role to play in the ecosystem. But even so, resistance to wolves remains in some rural outposts (Fischer 1995). It is within or near these outposts, however, where wolves may appear, not in the cities where most wolf supporters live. It is also within these outposts where humans can greatly affect wolf recovery. In Minnesota in the 1970s, for example, people killed Eastern timber wolves to "show their contempt for the animal's designation as an endangered species" (Lopez 1978). To rely on general citizen support for wolf recovery and laws to protect wolves in areas where wolves are still unwanted is insufficient. The survival of a species like the wolf revolves around human attitudes, not just biology.

A BRIEF HISTORY OF WOLF CONTROL IN THE U.S.

Many of the current issues surrounding wolf conservation today are founded on our country's history of predator control. Contempt and later control of the wolf in the United States are rooted in our European background, western religion, and lifestyles. "The hatred has religious roots: the wolf was the Devil in disguise. And it has secular roots: wolves killed stock and made men poor. At a more general level it had to do, historically, with feelings

about wilderness" (Lopez 1978).

With westward expansion in the 1800s wilderness was cleared, bison and big game herds were nearly eliminated, and wolves turned to killing livestock instead of their natural, suddenly scarce prey. As westward expansion occurred, hatred for wolves increased. Ranchers experienced heavy losses due to wolves in the 1880s and 1890s (Fischer 1995). Beyond economic losses, ranchers felt they had an obligation to protect their defenseless stock against predators. In time, the righteousness of these obligations became a major rationale for the foundation of bounty laws and extermination programs against wolves (Lopez 1978).

The issues of wilderness, protection of private property, the right to decide the fate of all creatures, and the moral obligation to protect defenseless animals from predators became the foundation for hate toward wolves (Lopez 1978). Through federal control programs and bounties, wolf numbers in the contiguous U. S. declined dramatically, from two million to several hundred in Minnesota by the 1950s (McIntyre 1995).

CURRENT ATTITUDES

Our history of wolf control still affects current wolf recovery. The people most directly affected by wolves and wolf recovery are those living within wolf range. These local residents, ranchers, and hunters, are also those most affected by federal or state wolf management policies. Furthermore, local

residents and hunters may have the greatest opportunity to directly affect wolf recovery through human-caused mortality of wolves (Tucker and Pletscher 1989). In Minnesota, over 30% of the farmers, hunters, and trappers surveyed by Kellert (1987) reported they might shoot a wolf they saw while hunting, indicating a serious potential problem of illegal killing.

Human-induced mortality of wolves was cited as the primary reason limiting wolf recolonization into suitable habitat in the Northern Rocky Mountains, thereby limiting natural recovery (Bangs 1991; USFWS 1987). Thus, if the success of wolf recovery hinges on the tolerance of the people having the greatest contact with the wolves (residents and hunters within wolf range), then understanding their attitudes toward wolves is essential. The natural recovery of wolves has already impacted rural areas of Montana. Presently, there are approximately 100 wolves which naturally recolonized Montana (USFWS 1995). In addition, humans have already affected natural wolf recovery through mortality. At least ten wolves have been shot illegally in Montana since 1982 (E. Bangs, Regional director of wolf recovery, USFWS, Helena, Mont., pers. commun.; Fischer 1995). Between 1985 and 1992, humans caused 72% of known wolf mortality in Montana, while livestock depredation control was responsible for 52% of the wolf losses (Bangs et al. 1995).

Along with continued natural wolf recovery and the reintroduction efforts of 1995 and 1996 in Central Idaho and Yellowstone National Park, increased wolf dispersal into more rural areas and increased human-wolf contact is expected.

Although wolf recovery plans designated specific recovery areas, ["selected because they are within the wolf's historic range, are large and remote enough to limit the potential for conflict with other land uses, offer an adequate year-round supply of prey, and contain little private land and no major livestock producing areas" (USFWS 1987)], there is nothing to deter wolves from dispersing outside of these areas. Ultimately, wolf recovery will involve the entire states of Montana, Idaho, and Wyoming (USFWS 1994).

In fact, reintroduced wolves have already been illegally shot. In January 1995 one reintroduced wolf from Idaho was shot and 3 wolves from Yellowstone were shot (Bangs and Fritts 1996). In addition, reintroduced wolves have killed livestock on several occasions (Bangs and Fritts 1996). With successful natural wolf recovery and reintroduction, wolf numbers will increase along with dispersal. In addition, human-wolf conflicts can be expected to increase.

Planning for potential human-wolf conflicts incorporates many objectives that promote wolf recovery, while considering the needs of local communities. If management policy fails to address the concerns of rural residents, residents will not tolerate wolves. In order to adequately address their needs, peoples' attitudes toward wolves and wolf management policies must be known.

Prior to the reintroduction of wolves in Yellowstone and Central Idaho, attitude surveys toward reintroduction were conducted. Bath examined the attitudes of Montana and Idaho residents (1990) and various interest groups

in Wyoming (1987) toward wolf reintroduction, while McNaught (1985) surveyed Yellowstone Park visitors' attitudes toward reintroduction. Except for Bath's survey of Montana residents, these surveys were done in regions where wolves were not yet present, and where attitudes were likely to be more positive toward wolves (Llewellyn 1978, Kellert 1985). Even in the Montana statewide survey (Bath 1990), only a few of the counties sampled were within wolf range.

In a statewide attitude survey toward wolves conducted in Minnesota, some respondents were living within wolf range (Kellert 1987). Another survey in Michigan determined factors contributing to anti-predator feelings by examining peoples' attitudes toward predators, wolves in particular. The authors found a correlation between respondents' lower education levels, rural backgrounds, a lack of knowledge about predators, concern for economic losses due to predators, fear of predators, and their "anti-predator" attitudes (Hook and Robinson 1982).

Tucker and Pletscher (1989) conducted an attitude survey of residents and hunters along the North Fork of the Flathead River, in Northwestern Montana, an area of natural wolf recovery. They found that "most" respondents, local residents and hunters, did support wolves in the area, however, only with management policies that would not restrict recreational or commercial uses of the land.

Although Tucker and Pletscher did survey residents living in areas affected by

wolves, respondents did not reside directly within wolf homerange (Ream et al. 1988), thereby limiting wolf-human conflicts. Furthermore, livestock interests in the area were minimal (P. Tucker, Wild Sentry, Hamilton, Mont., pers. commun.). The attitudes of residents in similar rural communities may differ depending on the extent to which wolves are present in areas inhabited by people and whether residents raise livestock which may be killed by wolves. It was wolves' impact on livestock, historically, which promoted their eradication in the rural west; people killed wolves to control wolf depredation on livestock (Lopez 1978). Therefore, unfavorable attitudes toward wolves may still be harbored by livestock interests.

Bath (1987) found Wyoming Stock Growers Association survey respondents had attitudes toward wolves varying from "strongly dislike" to "dislike" on his attitude scale. Furthermore, Kellert (1987) found that farmers (livestock producers) in Minnesota, were generally unfavorable toward wolves. Certainly, livestock producers still have strong opinions toward wolf recovery and management. As stated by the USFWS (1987), without assurance that wolves which kill livestock will be effectively controlled, the livestock industry will not support wolf recovery in the West.

By examining the attitudes of livestock producers and non-producers in a community situated within a wolf pack's homerange, the impact management policies have on livestock producers' and other residents' attitudes can be determined. In the Ninemile Valley of Northwestern Montana, I examined the attitudes of a rural community, where wolves have

been present for at least seven years, some of the residents are livestock producers, and most people have an interest in wolf management policies.

The main objectives of this study were to determine whether Ninemile residents' attitudes toward wolves in the valley were negative or positive and to examine some of the factors influencing those attitudes. Specifically, respondents' demographic background, fear of wolves, special interests (such as livestock ownership or hunting), and opinions toward management policies were examined and related to their attitudes toward wolves in the Ninemile Valley.

Of particular interest were residents' opinions toward wolf management policies which might contribute to a higher degree of local tolerance of wolves. For example, there is a private compensation fund available to reimburse ranchers for livestock killed by wolves which may make wolves more acceptable to the community. Another example is the presence of a biologist conducting research and maintaining contact with local residents.

Determining Ninemile Valley residents' attitudes toward wolves and how management policies may have influenced these attitudes could be very helpful for the management and conservation of wolves inhabiting areas near other rural and/or ranching communities. Knowing whether or not certain policies, public relations, or research studies promote the acceptance of wolves is essential before replicating or eliminating similar policies elsewhere.

There may also be wolf management policies which local residents detest, consider a waste of time and money, or simply do not understand. Frustration over federal and state policies could lead to greater intolerance of wolves and increased human-caused wolf mortality. Managers need to recognize which policies lead to intolerance, which lead to public support, and why. Only with policies designed to generate some level of local tolerance of wolves, will recovery be successful.

METHODS

SITE DESCRIPTION

The Ninemile Valley is in Missoula County, about 20 miles west of Missoula, in Western Montana. The valley is primarily agricultural and livestock are raised by 10 to 15 of the approximately 150 households. The livestock operations are small, each raising 20 to 160 head of cattle. There are fewer than one thousand head of cattle raised in the entire valley (M. Jimenez, Biologist, Univ. of Mont, pers. commun.). Many residents live on small plots of land and most do not participate in agricultural or livestock production.

Since 1989 when wolves were first documented in the valley, six generations of wolves have accounted for at least 32 wolves inhabiting Ninemile at different times. At the time this survey was conducted, the wolves had killed four dogs and livestock depredation had occurred in the valley on one occasion, in the spring of 1992 (Jimenez 1992). Humans illegally killed at least two wolves in the Ninemile Valley since 1989. One wolf dispersed out of the area to Southeast Washington and died of unknown causes (M. Jimenez, Biologist, Univ. of Mont., pers. commun.).

DATA COLLECTION

An attitude survey was mailed to the residents of the Ninemile Valley. I chose a mail survey instead of interviews because of the advantages of mailed

questionnaires. Anonymous, self-administered questionnaires allow respondents to report controversial opinions which, during interviews, they might be unwilling to discuss (Babbie 1995). This was especially important for this survey since some Ninemile residents knew me personally and their responses to sensitive issues could have been biased if I had interviewed them directly.

Questionnaire development

A participatory social research method (Finn 1994) was used. In a letter explaining the study and requesting participation, I asked residents to complete a self-addressed, stamped postcard with a checklist (Appendix 1) of wolf management issues and space to suggest additional issues. If an issue appeared on five or more returned postcards, it was included in the survey.

The questionnaire (Appendix 1) incorporated some methods and questions from other surveys (Tucker and Pletscher 1989; Bath 1987; and Hook and Robinson 1982) on attitudes toward wolves, as well as questions appropriate for the Ninemile area. One third of the survey was made up of 17 Likert scale statements with five options of response, from strongly agree to strongly disagree, to gauge relative strength of agreement to each statement (Babbie 1995). Twenty-six multiple choice type questions collected demographic information and opinions on specific policies. Six open-ended questions were asked to give respondents the opportunity to write comments that could not be expressed through their answers to other question types.

A draft questionnaire was reviewed by wolf attitude researchers, wolf biologists, wildlife managers, and several social research experts (List of reviewers, Appendix 2). The survey was then revised to increase its clarity and reliability.

The final questionnaire consisted of 74 questions in seven main sections including: respondents' contact with wolves, attitude toward wolves, wolf management policy, demographic information, and three sections on the impacts of hypothetical management policies. Respondents answered 49 to 58 questions in five of the seven sections, depending on their answers to attitude questions and followups to a preceding affirmative answer.

The questionnaire was pretested using students of a social research course at the University of Montana and residents of Trego, a town in Northwestern Montana. Trego is similar to the Ninemile Valley, being a rural area where some residents raise livestock and wolves are present. Questions and survey format were modified to reduce confusion and survey length and to clarify questionnaire wording. The pretest in Trego was especially helpful in revealing more subtle problems in question presentation and content which had not appeared during the first pretest.

Questionnaire distribution

The final questionnaire, along with a cover letter and a self-addressed, stamped envelope, was sent to all 300 residents in the Ninemile Valley with obtainable addresses. I gathered residents' addresses from voter registration

lists and telephone directories. Addresses were listed by each individual's name. Therefore, a questionnaire was sent to each member of a household who was at least 18 years old. This allowed me to compute a response rate for individuals (if a person responded to the survey) and for households (if at least one member of a household responded to the survey).

The first mailing of the questionnaire was on April 3, 1996. Postcard reminders followed on April 18 to those who had not yet returned the survey, and a second copy of the questionnaire with another reminder and self-addressed, stamped envelope two weeks later on May 2, to those who still had not responded. Finally, I sent thank you postcards on May 25, three weeks after the last reminder.

Interviews

Follow-up interviews ensured the initial questionnaire was thorough and that respondents could express their opinions through the questions asked. Another reason for conducting interviews was for residents to comment on the issues outside the structure of the written questionnaire. Finally, the interviews gave residents the opportunity to suggest ideas they believed would make wolves in the valley (or in other rural communities) more tolerable to residents. I conducted two types of interviews: short phone interviews and longer personal interviews.

Telephone interviews (May 1996)

Each name on the Ninemile list was assigned an id. number from one to 300.

Using a random number table (Babbie 1995), a sample of 16 residents was selected by id. number from the Ninemile address list. If the number from the table was greater than 300 (the highest possible i.d. number) the next number in the table was used. If the associated i.d. number on the resident address list was unusable (a person already chosen to be interviewed personally, a person with no listed phone number, or someone who had moved) the next person on the list was selected.

After up to three contact attempts, each attempt at a different time of day, the next person on the list was selected. If that next person's phone number was not listed, a new i.d. number was chosen, using the random number table. I questioned sixteen residents over the phone about their opinion on the written questionnaire and whether they had any other comments about wolves or wolf management.

Personal Interviews (May 1996)

Four residents were selected for personal interviews (one could not be reached, however). These respondents were not randomly chosen but were residents I knew and had spoken with at earlier times. Each interviewee had specific ideas about wolves and wolf management. Interviewees included: a livestock producer, a person whose pet had been killed by wolves, and someone who supported wolf presence in Ninemile. Interviews were very informal and we discussed three main issues: 1) the relevance of the questionnaire 2) their comments on wolves or wolf management and 3) pet-wolf conflicts.

DATA ANALYSIS

Analysis of questionnaire response data

I used the Statistical Package for Social Sciences (SPSS) version 7.0, to determine the relationships between residents' attitudes toward wolves and other question responses. Univariate statistics, the frequency of responses to each possible answer for every variable or question, were computed.

Attitude and fear-of wolves scale construction

I used principle components factor analysis with varimax rotation to expose dimensions and response patterns to the Likert scale type statements on attitudes toward wolves. Factor analysis is a common method used to summarize data by discovering dimensions, or factors, which may explain response patterns among a large number of variables (Hair et al. 1995; Babbie 1995). If the dimensions exposed are reliable, answers to multiple questions which address similar issues and have similar response patterns can be combined into one new variable or scale, representing that main factor, rather than relying on a single question for results.

A factor must explain a large portion of the variance found among the original variables and be independent of other constructed factors (Hair et. al. 1995; Babbie 1995). This is examined through factor loading, the correlation between the original variable and the factor, and determines what percentage of the variation in the variable is due to the factor. This allows one to determine which original variables group together and which may be considered in selection of a new variable, representing the original variables.

Factors are considered very significant if the factor loading is .50 or greater (Hair et al. 1995). See Appendix 3 for factor loading of Likert scale type statements on attitudes toward wolves.

After factor analysis of Likert statements, I determined which dimensions the analysis had yielded by examining the statements which had been grouped together. Two types of statements appeared, one addressing general issues on attitudes toward wolves and one concerning peoples' fear and the dangerousness of wolves. Based on analysis results and my examination of the statements, I constructed a single variable (or scale) to measure and score respondents' general attitudes toward wolves and a second new variable for respondents' level of fear of wolves. I used Cronbach's alpha reliability test to check the reliability of the factors created through factor analysis (Hair et al. 1995). Reliability test results are found in Appendix 3. Respondents' attitude and fear-of-wolves scores were correlated positively using a one-tailed Pearsons correlation test (Huck and Cormier 1996).

Categorization and tabulation of open-ended questions

Similar types of comments from different respondents were coded and categorized to determine what response patterns appeared (Babbie 1995). I also computed the frequency of responses or comments within each category type.

Analysis of telephone interview response data

Categorization and tabulation of responses

I categorized answers and comments to questions asked during the interviews and noted the frequency of responses within each category type. I determined the number of people interviewed who had responded to the written questionnaire and whether they thought it was clear, confusing or biased. In addition, percentages of respondents who were pro, neutral, or anti-wolf presence in Ninemile were determined to compare with results from the written survey.

Analysis of personal interview responses

I quoted interviewees in the discussion of my results, but ran no quantitative analysis since the sample was small (n=3). These results, along with those from telephone interviews, supplement the written questionnaire results and play an important role in the development of my conclusions.

MEASURES OF ATTITUDE

Ninemile residents' attitudes toward wolves were measured with two methods. First, an attitude score was computed for each respondent. A respondents' attitude score could vary from 1.0 (the lowest possible score) indicating a strong dislike of wolves to 5.0 (the highest possible score) indicating a very favorable attitude toward wolves. A score of 3.0 would demonstrate a respondent's neutral opinion of wolves. In order to compare the attitudes of respondents based on their answers to survey questions, the

mean attitude score was computed for each group of respondents to a particular answer to a question. The second method used to determine residents' attitudes toward wolf presence was their response to the question: "Do you hope wolves continue to inhabit the Ninemile Valley?"

The fear-of-wolves score was computed based on the answers of two statements: "Wolves in the woods can often be dangerous to humans" and "Wolves and grizzly bears are equally dangerous to humans." Coupled, these questions were used as an index for fear of wolves or belief that wolves are dangerous. A low score (less than 3.0) on the fear-of-wolves scale demonstrated a fear of wolves, as respondents agreed with the statements above, while a high score (greater than 3.0) indicated a person had little or no fear of wolves.

RESULTS

QUESTIONNAIRE RESPONSE RATE

Of the compiled resident address list of 300, 272 were current, valid addresses. The response rate of individuals to the questionnaire was 57%, or 155 returned questionnaires. The household response rate was 63.6%, meaning at least one questionnaire was completed by a member in 100 of the 158 different households. The approximate response rates after each mailing were: 35% (of 272) after the first mailing; 10% after the first reminder; 11% after the second reminder; and less than 1% following the thank you postcards.

ATTITUDES

In the analysis of this survey, two factors (attitude and fear) best explained the response data of 7 of the 9 Likert scale statements on opinions about wolves. The factor loadings of all 7 statements were > .50 (Appendix 3). The mean attitude score of all respondents was 2.82 and scores varied from 1.0 to 5.0 (Figure 2a). Attitude scores reported for response groups to a particular question are the computed mean attitude scores of each group.

Of the 133 residents who answered the question: "Do you hope wolves continue to inhabit the Ninemile Valley?" most (51.7%) answered "yes" (Table 1). As would be expected, the mean attitude score of respondents who were supportive of wolf presence, 3.81, was higher than those respondents

with no opinion, 2.53, and those respondents (40.1%) who do not want wolves to inhabit Ninemile, 1.60. Many of the other questions on policy and demographics were also related to respondents' attitude scores.

DEMOGRAPHICS AND ATTITUDE

General demographics of the residents of the Ninemile Valley influenced their attitudes. The respondents' gender, education, and number of years of residency in Ninemile, all influenced their attitudes toward wolves. The mean attitude score of female respondents was higher (3.20) than males (2.51), indicating a more favorably view of wolves among women. Education level was also related to attitude. Mean attitude scores increased with some college education and graduation (Table 2).

Differences in attitude were also related to the number of years a respondent had lived in the valley. The majority of the respondents to the survey (94%) were permanent rather than seasonal and had lived in Ninemile for at least 6 months at the time the survey was administered. Mean attitude scores of respondents decreased with a higher reported number of years of residency in the Ninemile Valley. People who had lived in the valley for 3 or fewer years had a higher mean attitude score (3.45) than did residents of 21-60 years (2.57).

FEAR OF WOLVES AND ATTITUDE

The distribution of respondents' fear-of-wolves scores was skewed negatively,

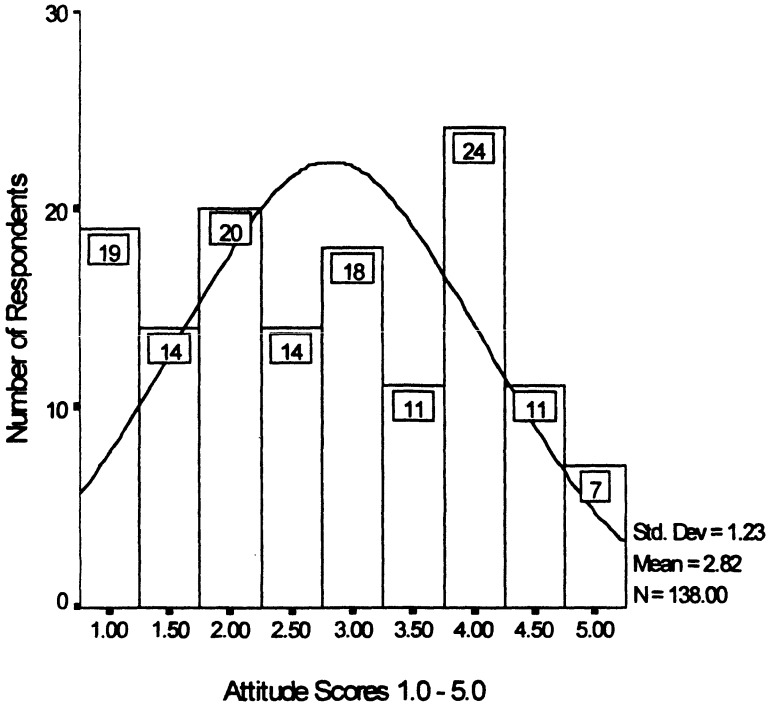

Figure 2a. Distribution of Attitude Scores (1.0-5.0) among respondents.

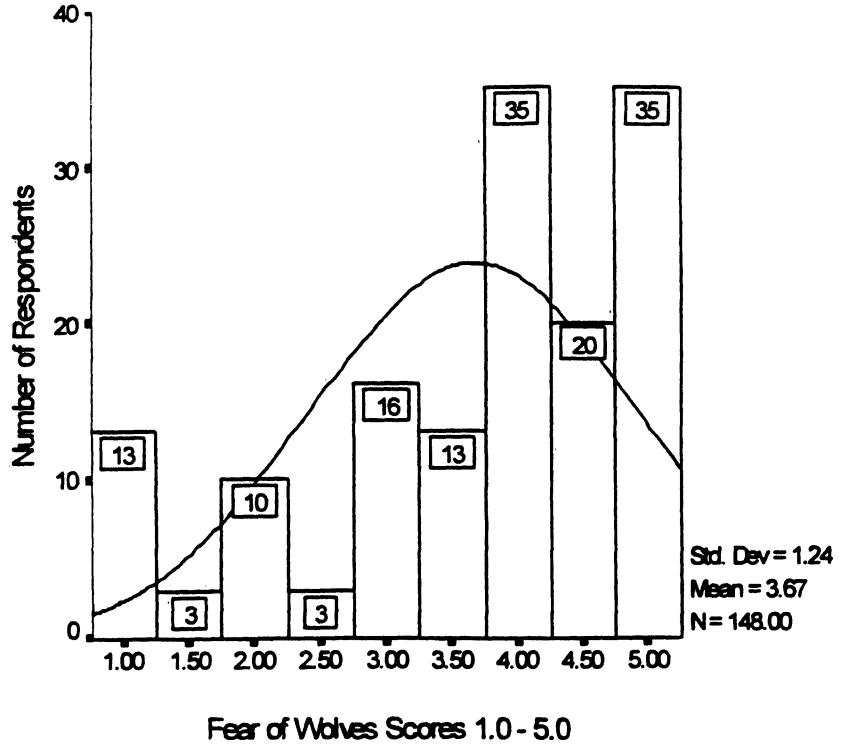

Figure 2b. Distribution of Fear-of-wolves Scores (1.0-5.0) among respondents.

demonstrating little fear among the majority of residents surveyed (Figure 2b). Residents' fear score was positively correlated with their attitude toward wolves (r= .4151). A low score on the fear-of-wolves scale, indicating a strong fear of wolves, was correlated with a low attitude score, indicating an unfavorable opinion toward wolves.

No strong relationship appeared between peoples' fear and their education level, although the level of fear decreased slightly as education level increased. Males and females mean fear scores, 3.75 and 3.61 respectively, varied slightly. Respondents who had lived in Ninemile for three or fewer years had a higher mean score on the fear-of-wolves scale (indicating little, or no fear) than residents who had lived in Ninemile for more than 3 years (Table 3).

SPECIAL INTERESTS AND ATTITUDES

The mean attitude score for non-hunters was 3.38, higher than the mean score of respondents who hunt, 2.43. People who raise animals for food or sale had a mean attitude score below the mean score of respondents who do not raise animals, 2.00 and 3.04, respectively. Of the 28 people who raise animals for food or sale, 16 are livestock (cattle) producers. These cattle producers had a mean attitude score (1.71) lower than that of other animal raisers (2.38).

Table 1

"Do you hope wolves continue to inhabit the Ninemile Valley?"

Responses		Mean Attitude Score
51.7%	Yes	3.81
40.1%	No	1.60
8.2%	No opinion	2.53

Table 2

Mean Attitude Scores by Level of Education

Responses	Education	Mean Attitude Scores
8.8%	Some highschool	2.62
38.5%	Highschool graduate	2.46
23.0%	Some college	2.88
29.7%	College graduate	3.28

Table 3

"How many years have you lived in the Ninemile Valley?'

Responses	Years of residency	Mean Fear Score
20.9%	3 or fewer	4.16
32.4%	4-12	3.66
18.2%	13-20	3.28
28.4%	21-60	3.50

Table 4

"Eight or more years ago, before wolf presence in the Ninemile Valley, your opinion of wolves was..."

Response %		Mean Attitude Score
8.2%	Less favorable than it is now	3.34
62.6%	The same as it is now	2.86
15.6%	More favorable than now	2.07
13.6%	I don't know	3.36

ATTITUDE CHANGES OVER TIME

People were asked whether or not their opinion toward wolves was the same as it was in the past (Table 4). Most respondents (62.6%) indicated that their opinions had not changed, while 15.6% reported an unfavorable change, and 8.2% reported a positive change (Table 4).

An open-ended question followed the one above, asking any respondents whose opinion had changed to list the reason why. The reason most frequently noted for opinions becoming more favorable was the respondent's education or increased familiarity or understanding of wolves. Living in Ninemile or in Montana was the second most frequently noted reason for this type of change. The two most frequently noted reasons why respondents were less favorable now than eight years ago were: declines in deer and elk numbers and mismanagement (including the lack of local control of management on their own property). The costs of wolf management, the experience of living within wolf range, and concern for the loss of pets were additional reasons. Other reasons for favorable and unfavorable changes are listed separately by response group in Appendix 4.

MANAGEMENT POLICIES PROMOTING TOLERANCE

Biologists working in the community

One objective of this project was to discover whether residents believed that contact with research biologists working in a community within wolf range would increase tolerance of wolves in that community. Responses were split

closely and the mean attitude score of each main response group differed. Respondents (34.3%) who agreed that tolerance would increase had a higher mean attitude score than respondents (35.6%) who disagreed (Table 5). Of the 16 cattle producers who responded to this statement, only one agreed, while 12 (75%) disagreed (or strongly disagreed) and 3 (18.7%) were neutral.

Opinions on the presence of a biologist in communities within wolf range were also addressed through the statement: "It is a good idea to have a biologist working in areas where both wolves and people are present." Only 25.9% of the respondents disagreed, while 44.8% agreed. The mean attitude scores of response groups differed from one another. Respondents who thought biologist presence was a good idea had a higher mean attitude score (3.59) than those who disagreed with the statement (2.33) (Table 6). Of the 16 cattle producers who responded to this statement, 18.7% (3) strongly agreed; 6.2% (1) agreed; 31.2% (5) were neutral; 18.7% (3) disagreed; and 25% (4) strongly disagreed.

Defenders of Wildlife compensation program

Another objective aimed at understanding whether outside support promotes tolerance of wolves was to determine if residents thought the program for financial reimbursement of wolf-related livestock depredation increases the community's tolerance of wolves. The majority of respondents to the survey (89.5%) were aware that there is a financial compensation program for verified wolf-related livestock depredation and 37.9% of all respondents agreed that it had made wolf presence in the valley more

Table 5

"Having a biologist work in areas where both wolves and humans are present would lead to greater acceptance of wolves by local residents."

Responses		Combined responses	Mean Attitude Score
19.9%	Strongly Agree		3.89
14.4%	Agree	34.3% Agree	3.52
30.1%	Neutral/No opinion	30.1% Neutral	2.93
14.4%	Disagree	35.6% Disagree	2.28
21.2%	Strongly Disagree		1.52

Table 6

"It is a good idea to have a biologist working in areas where both wolves and people are present."

Responses		Combined responses	Mean Attitude Score
28.7%	Strongly Agree		3.21
16.1%	Agree	44.8% Agree	3.59
29.4%	Neutral/No opinion	29.4% Neutral	2.76
11.2%	Disagree	25.9% Disagree	2.33
14.7%	Strongly Disagree		1.64

Table 7

"The program for financial reimbursement of verified wolf-related livestock depredation makes the presence of wolves in the Ninemile Valley easier to tolerate."

Responses		Combined responses	Mean Attitude Score
18.6%	Strongly Agree		3.36
19.3%	Agree	37.9% Agree	3.34
26.9%	Neutral/No opinion	26.9% Neutral	3.15
9.7%	Disagree	35.2% Disagree	2.84
25.5%	Strongly Disagree		1.68

tolerable. Responses were split closely, however, and mean attitude scores varied by response group (Table 7).

Of the 16 cattle producers who responded to this survey, 56.2% strongly disagreed that the reimbursement program increased peoples' tolerance of wolves, while 31.2% believed it did. The mean attitude scores of those who strongly disagreed differed from those who agreed and strongly agreed (Table 8).

Another issue regarding the reimbursement fund for livestock depredation was analyzed through the statement: "Reimbursement for the market value of a cow killed by wolves is not enough to make up for *both* the loss of the cow and the inconvenience to the rancher." Almost half of the respondents (49.3%) agreed with this statement, while 28.8% disagreed (Table 9). Response groups had different mean attitude scores. Of the 16 cattle producers who responded to this question, 81.2% (13) strongly agreed that reimbursement is not sufficient, while 12.5% (2) agreed, and 6% (1) were neutral, none disagreed with the statement.

The effects of hypothetical policies and scenarios on opinions

The objective of collecting these results was to determine if any policies might influence respondents' opinions and attitudes toward wolf presence in Ninemile. Some policies might raise tolerance of wolves in people who wished wolves did not inhabit Ninemile or in residents with no opinion, while others might reduce tolerance of wolves in residents who hoped

Table 8

Responses cattle ranchers (n=16): "The program for financial reimbursement of verified wolf-related livestock depredation makes the presence of wolves in the Ninemile Valley easier to tolerate."

Responses		Combined responses	Mean Attitude Score
18.7%	Strongly Agree		2.53
12.5%	Agree	31.2% Agree	2.30
12.5%	Neutral/No opinion	12.5% Neutral	2.00
0	Disagree	56.2% Disagree	n/a
56.2%	Strongly Disagree		1.71

Table 9

"Reimbursement for the market value of a cow killed by wolves is not enough to make up for *both* the loss of the cow and the inconvenience to the rancher."

Responses		Combined responses	Mean Attitude Score
39.0%	Strongly Agree		1.87
10.3%	Agree	49.3% Agree	2.71
21.9%	Neutral/No opinion	21.9% Neutral	3.27
19.9%	Disagree	28.8% Disagree	3.90
8.9%	Strongly Disagree		4.0

wolves continue to inhabit Ninemile.

People who hoped wolves continued to inhabit the Ninemile Valley (n=76) were asked to answer Yes or No by specific situations and policies (Table 10). An answer of Yes meant the respondent might change his or her mind about their desire to have wolves in Ninemile given that particular policy or circumstance.

The two issues likely to negatively affect most respondents' attitudes were land use restrictions (68%) and ineffective control of wolves that killed livestock (65%) (Table 10). Respondents could also write in other situations that might make them change their mind and oppose wolf presence. The situations given most often were related to direct wolf-human conflicts: if wolves were a threat (to people), if confrontations occur, and if the number of people living in Ninemile increased. Ten people of 76 (13%) expressed their concern over these issues. Additional comments are listed in Appendix 5.

People who wished wolves did not inhabit the Ninemile Valley (n=58) were asked to answer Yes or No by different situations and policies. An answer of Yes meant that the respondent might favor wolf presence in Ninemile given the specific circumstance or policy change (Table 11).

The scenario most likely to change the greatest number (22.4%) of "anti-wolf" respondents' opinions was if research showed that wolves have no longterm effects on deer and elk populations. If wolves were monitored consistently,

Table 10

Impacts of hypothetical scenarios on wolf supporters' opinions (n=76) "If you hope wolves continue to inhabit the Ninemile Valley, please circle YES after any of the situations below that might change your opinion or circle NO after any of the situations that would not change your opinion."

% YES	Policies or Situations
68%	If wolf presence in the Ninemile Valley resulted in significant land use restrictions.
65%	If wolves that kill livestock were not controlled quickly or effectively.
41%	If the program for compensation for wolf-related livestock depredation ends.
39.6%	If one of your pets is killed by wolves.
38.7%	If the number of wolves in the valley increases substantially.
31%	If research studies show that wolves have longterm affects on deer and elk numbers.
24%	If all monitoring by research biologists ends.

Table 11

Impacts of hypothetical scenarios on "anti-wolf" residents' opinions (n=58)
"If you wish wolves did not live in the Ninemile Valley, please circle YES after any of the situations below that might change your opinion or circle NO after any of the situations that would not change your opinion."

% YES	Policies or Situations
22.4%	If research studies showed that wolves have no longterm effects on deer and elk numbers.
12.1%	If wolves were monitored on a monthly basis all year round.
9.2%	If prompt and effective control was available to handle wolf-related problems.
7.2%	If wolves that killed pets were killed or otherwise removed.
5.2%	If residents received $5000 when wolves successfully denned on their property.
4.6%	If residents still receive reimbursement for livestock losses even when they *cannot* be verified as wolf related.

on a monthly basis, 12.1% of the 58 respondents might change their mind. Respondents to this section also had the chance to write in situations that might make them change their minds favorably. The most common response was "Nothing" (12% of 58). Other comments were related to eliminating costs to the people (10%) and allowing locals to have control of wolf management (6%). Additional categories are listed in Appendix 5.

Respondents who had no opinion concerning wolf presence in the valley (n=11) were asked to answer "Oppose" or "No" by the scenarios and policies. An answer of "Oppose" meant the respondent might oppose wolf presence in Ninemile given the scenario, while No meant their current neutral opinion would not be affected (Table 12). Two scenarios which might encourage 100% of currently neutral respondents to oppose wolf presence were: "If research studies show that wolves have longterm affects on deer and elk numbers" and "If wolf presence in the Ninemile Valley resulted in significant land use restrictions." An additional two scenarios which may change 82% of the neutral respondents' opinions negatively were: "If the number of wolves in the valley increases substantially" and "If wolves that kill livestock were not controlled quickly or effectively."

Neutral respondents were also asked to comment on which policies or scenarios would make them favor wolf presence in the valley. The respondent answered "Favor" if the scenario would positively affect their opinion and "No" if the scenario would not change their opinion. Of the respondents who presently have no opinion toward wolf presence 71.4%

Table 12

Impacts of hypothetical scenarios on neutral residents' opinions (n=11)

"If you presently do not have an opinion about wolves inhabiting the ninemile Valley, please circle OPPOSE by any of the situations described below which would make you *oppose* wolf presence or circle NO if the situation would not influence your present opinion."

% OPPOSE	Policies or Situations
100%	If research studies show that wolves have longterm affects on deer and elk numbers.
100%	If wolf presence in the Ninemile Valley resulted in significant land use restrictions.
81.8%	If the number of wolves in the valley increases substantially.
81.8%	If wolves that kill livestock were not controlled quickly or effectively.
54.5%	If the program for compensation for wolf-related livestock depredation ends.
45.5%	One of your pets is killed by wolves.
27.3%	All monitoring by research biologists ends.

Table 13

Impacts of hypothetical scenarios on neutral residents' opinions (n=11)

"Now, please circle FAVOR by the situations described below which might make you *favor* wolf presence or circle NO by situations which would not influence your present opinion."

% FAVOR	Policies or Situations
71.4%	If prompt and effective control was available to handle wolf-related problems.
58.3%	If research studies showed that wolves have no longterm effects on deer and elk numbers.
50%	If wolves that killed pets were killed or otherwise removed.
38.5%	If wolves were monitored on a monthly basis all year round.
28.6%	If residents received $5000 when wolves successfully denned on their property.
21.4%	If residents still receive reimbursement for livestock losses even when they *cannot* be verified as wolf related.

might favor wolf presence if they felt "prompt and effective control was available to handle wolf-related problems," while 58.3% might favor wolf presence if wolves had no longterm effects on deer and elk numbers (Table 13). Neutral respondents were much more likely to change their opinions favorably than respondents who did not support wolves.

REASONS FOR SUPPORT AND TOLERANCE

Respondents were asked: "If you hope wolves continue to inhabit the Ninemile Valley, what is your main reason for supporting the presence of wolves in the valley?" Most comments were from "pro-wolf" respondents and some people wrote more than one reason. Percentages are of the total number of reasons listed (55) by all who responded to this question. The main reasons listed were related to the natural role wolves play in an ecosystem: wolves belong, are a part of nature; wolf presence is natural and contributes to ecosystem balance; wolves have a natural right to exist (71%). Secondary reasons included: wolf presence poses no threat, no reason not to accept wolves (14.5%); respondents' love of wildlife or wolves and the esthetic value of wolves (7.2%); and the respondent liked seeing or hearing wolves (7.2%).

The questionnaire also asked, "If any factor has made the wolves in the Ninemile Valley more or less tolerable for you, please describe it here:" Of the approximate 15 reasons given by respondents to this question, factors that have made wolves more tolerable included education, increased familiarity

or understanding of wolves (53.3%) and personal experience in Ninemile, such as seeing or hearing wolves (46.6%).

REASONS FOR NO SUPPORT AND LESS TOLERANCE

Respondents were also asked: "If you wish wolves were not present in the Ninemile Valley, what is your main reason for opposing wolf presence in the valley?" Of the 102 comments listed, most were from non-supporters. Some respondents listed more than one reason. The most commonly noted reason for a lack of support for the wolves was a decline in game numbers (23.5%). Concerns over pets being killed by wolves (15.6%), livestock losses (13.7%), and the fact that there are "too many people in Ninemile" (13.7%) were all raised. Additional reasons included: wolves are dangerous (7.8%), wolves are unnecessary and not endangered (6.8%), problems and conflicts will occur (4.9%), land use restrictions will result (4.9%), and costs to the people are unacceptable (8.8%).

Specific factors have made wolves less tolerable to some residents. Respondents offered a total of 30 comments on factors making wolf presence less tolerable. The most frequently noted were: a decline in game numbers (36.6%) and wolf-human or wolf-pet conflicts (30.0%). Additional factors include: mismanagement by the government or outsiders (20.0%) and the media (13.3%).

SPECIFIC WOLF MANAGEMENT POLICIES

Increase in wolf numbers and harvest seasons

Two questions addressed respondents' opinions on policy related to increasing wolf numbers. Most respondents (55.7%) agreed that to prevent a pack of wolves from reaching its carrying capacity, or the highest number the valley can naturally support, some wolves should be relocated (Table 14). The majority of respondents (60.2%) also agreed with the statement: "If the number of wolves in Montana reaches the recovery goal numbers stated in the Rocky Mountain Wolf Recovery Plan (as developed by the U. S. Fish and Wildlife Service), a regulated harvest season for wolves should be opened." Mean attitude scores differ by response group for both of the policy statements above (Table 15).

Livestock Depredation and Pet loss

Respondents' support for wolf control and management was also examined in terms of livestock depredation and pet losses. If wolves kill livestock for the first time, 21.5% of the respondents felt that wolf should be killed, 25% thought it should be relocated, and 40.3% wanted it monitored by biologists (Table 16). Another 13.3% marked the "other" category and the most common response written was "Do nothing" (10% of all respondents).

If a wolf kills pets, 24% of respondents wanted the wolf killed, 17.8% wanted the wolf relocated, and 40.4% wanted the wolf monitored (Table 17). Another 17.8% marked the "other" category, the most common response written was "Do nothing" or "Blame the owner" (7.8% of all respondents).

Table 14

"To keep a pack of wolves from reaching the highest number the land can naturally support, some wolves from that pack should be relocated out of the area."

Responses		Combined responses	Mean Attitude Score
33.6%	Strongly Agree		2.13
22.1%	Agree	55.7% Agree	3.66
18.6%	Neutral/No opinion	18.6% Neutral	3.35
8.6%	Disagree	25.7% Disagree	3.50
17.1%	Strongly Disagree		2.54

Table 15

"If the number of wolves in Montana reaches the recovery goal numbers stated in the Rocky Mountain Wolf Recovery Plan (as developed by the U.S. Fish and Wildlife Service), a regulated harvest season for wolves should be opened."

Responses		Combined responses	Mean Attitude Score
46.2%	Strongly Agree		1.80
14.0%	Agree	60.2% Agree	3.18
14.0%	Neutral/No opinion	14.0% Neutral	3.60
8.4%	Disagree	25.9% Disagree	3.96
17.5%	Strongly Disagree		3.99

Table 16

"If a wolf kills livestock for the first time, that wolf should be..."

Responses	
40.3%	Monitored closely by biologists
25.0%	Relocated to another area where there are no livestock
21.5%	Killed
13.3%	Other

Respondents were also asked whether they believed owners of pets killed by wolves should be reimbursed (Table 18). Most residents (50.3%) agreed that pet owners should be reimbursed. Those who agreed with the statement had a lower mean attitude score (2.53) than respondents who disagreed with this policy (3.69).

Funding

Respondents were asked to choose which group they thought should be funding wolf research projects (Table 19). The group marked by the greatest number of respondents (39.9%) was "Private interest groups," next was U. S. Fish and Wildlife Service (27.3%), and finally MT Dept. of Fish, Wildlife and Parks (17.5%). The most frequently written comments from the "other" category were: people who want wolves (3% of all respondents) and people who reintroduced wolves (2.2% of all respondents).

Research Wanted

Some comments to the question on funding implied that no research was wanted. Table 20 displays the results of a question aimed at determining whether residents of Ninemile want research projects conducted on wolves inhabiting areas near people. Although 42.3% of respondents did agree that research was important, 26.1% did not. Mean attitude scores differ for each response group (Table 20).

Table 17

"If a wolf kills pets, that wolf should be..."

Responses	
40.4%	Monitored closely by biologists
17.8%	Relocated to another area
24.0%	Killed
17.8%	Other

Table 18

"If pets are killed by wolves the owners should be reimbursed for their losses."

Responses		Combined responses	Mean Attitude Score
38.1%	Strongly Agree		2.32
12.2%	Agree	50.3% Agree	2.53
19.4%	Neutral/No opinion	19.4% Neutral	3.44
14.4%	Disagree	30.2% Disagree	3.69
15.8%	Strongly Disagree		3.24

Table 19

"If research must be conducted on wolves in Montana, it should be funded by..."

Responses	
27.3%	U.S. Fish and Wildlife Service (Federal Tax Dollars)
17.5%	MT Dept. Fish, Wildlife and Parks (Hunting License Fees)
39.9%	Private interest groups
8.4%	2 of the above
7.0%	Other

Table 20

"When wolves inhabit areas close to people, it is important to conduct research projects to study wolf movements."

Responses		Combined responses	Mean Attitude Score
26.8%	Strongly Agree		2.91
15.5%	Agree	42.3% Agree	3.25
31.7%	Neutral/No opinion	31.7% Neutral	3.03
8.5%	Disagree	26.1% Disagree	2.55
17.6%	Strongly Disagree		2.12

Table 21

"Please circle the one type of information source below where you obtain most of your information about wolves."

	Responses by opinions toward wolf presence			
Source	Pro	Neutral	Anti	Total %
Friends and relatives	10	3	12	13.5%
Magazines	6	1	1	4.3%
Movies	1	0	0	0.5%
Books	17	0	4	12.5%
Public meetings	3	0	1	2.1%
Newspapers	21	7	17	24.4%
Television	6	2	7	8.1%
Scientific papers	3	0	2	2.7%
Personal experience	7	3	13	12.5%
Biologists studying wolves	12	1	13	14.1%
Other:				
Neighbors	3	0	0	1.6%
School	1	0	0	0.5%
Farmers	0	0	1	0.5%

SOURCES OF INFORMATION ABOUT WOLVES

Because education efforts are often suggested as one way to influence peoples' attitudes favorably, respondents to this survey were asked where they obtained most of their information about wolves. The newspaper was the source most frequently noted. However, biologists studying wolves, friends and relatives, books, and personal experience were additional significant sources of information (Table 21).

INTERVIEW RESULTS

Some quantitative results were gathered from telephone interviews (n=16). While this sample is small and, therefore, should not be applied to the population of Ninemile, it is still worthwhile to compare these results with those of the questionnaire. The majority of residents interviewed over the phone had also completed the written questionnaire (75%). Of those 12 interviewees, 58.3% were supportive of wolves in Ninemile (in contrast to 51.7% from all questionnaires); 33.3% were not supportive (rather than 40.1%), and 8.3% (compared to 8.2%) had no opinion. Of the four people interviewed who had not completed questionnaires, one was supportive of wolves in the valley, one was not, and two had no opinion.

Of the 16 people asked, only 14 gave opinions on the questionnaire. Of these 14, 78.5% (11) thought the questionnaire covered relevant issues and was clear and unbiased, 14.2% (2) thought it was confusing, and 7.1% (1) thought it should have covered more environmental issues.

Comments and quotes from telephone and personal interviews were used in the discussion and confirmation of quantitative results.

DISCUSSION

RESPONSE RATE AND BIAS

Peoples' opinions about wolves tend to be strong ones, either for or against them. This may raise the response rate of attitude surveys about wolves. However, this does not mean non-respondents have no opinion on the subject. Two of the four non-respondents interviewed by phone had opinions toward wolves, while two did not.

For this survey, the individual response rate was 57% while the household response rate was 63.6%. The individual response rate to similar surveys varied from 50-90% (Bath 1990; Tucker and Pletscher 1989; Kellert 1987; and Hook and Robinson 1982). The opinions of the 10 to 15 livestock producing households in the valley were represented by 16 individual livestock producers who responded to the survey. Ninemile residents who hunt were also well represented, as 60% of all respondents to the survey hunt.

Because the objective of this survey was to reach the entire population of Ninemile, the list of residents was not collected randomly, but was based on availability of residents' addresses. Thus, the results from respondents should not be inferred to the remainder of the Ninemile population, the non-respondents. Of the 16 residents randomly selected for telephone interviews, 12 were respondents to the written questionnaire and their attitude responses (58.3% supportive of wolf presence, 33.3% unsupportive,

and 8.3% neutral) were similar to those of all respondents.

FACTORS INFLUENCING ATTITUDES

Peoples' like or dislike of wolves can be based on many factors. Residents' demographics and fear of wolves can influence their opinions. Dislike of wolves could be caused by peoples' perceptions of wolves' "responsibility for causing human property damage, predatory and carnivorous nature, wilderness association, and cultural and historical antipathies" (Kellert 1985). Affinity for the wolf could stem from their social structure, size, and intelligence (Kellert 1985). This study examined a number of specific factors related to rural residents' attitudes toward wolves in the Ninemile Valley.

Demographic background and attitude

The mean attitude score of females in this survey was higher than for males, 3.20 and 2.51, respectively. These scores contrast Kellert's findings, which reported "females ... had relatively negative views of predators" (Kellert 1985). The Ninemile scores could be related to men being more involved in an activity which may conflict with wolf presence, such as hunting (81.8% of all male respondents were hunters, opposed to 34.3% of all female respondents).

People who had lived in the valley for 3 or fewer years had a higher mean attitude score (3.45) than did residents of 4-12 years (2.74), 13-20 years (2.59), and 21-60 years (2.57). There are a number of reasons that could explain this. Some people may have learned of wolf presence in Ninemile and moved

there specifically for that reason. Clearly, those people would have more positive attitudes toward wolves. New residents may not have experienced the loss of a pet or any other negative wolf-related impact and, therefore, their attitudes have not yet been negatively influenced. It is also possible that recent arrivals to the valley buy smaller parcels of land and are not livestock producers. Any one or combination of the reasons above could explain why new arrivals have more positive attitudes toward wolves than longtime residents. Additionally, results showed how this group of residents also had little fear of wolves. Because peoples' fear of wolves is related to their attitude toward them, new residents' high attitude score may be related to their lack of fear of wolves. A follow-up study on this topic could be interesting.

Fear and attitude

Fear is one of the factors found in this study and others which was related to negative attitudes toward wolves. A low score on the fear-of-wolves scale, indicating a respondents' fear of wolves, was correlated with a low attitude score. Kellert (1987) noted that negative attitudes toward wolves may be related to fears and reported a "moderate" overall level of fear of wolves in respondents to his Minnesota survey. Peoples' level of fear toward wolves appeared to contribute to anti-wolf attitudes in a survey in the North Fork, Montana (Tucker and Pletscher 1989). The same theme was demonstrated in a survey of Michigan citizens, anti-predator feeling increased with fear (Hook and Robinson 1982). The results of this survey in Ninemile were consistent with those of similar attitude surveys, indicating that fear of wolves continues to be a factor influencing peoples' attitudes.

Fear of wolves is related to our cultural history. For example, wolves were vicious and cruel villains in our fairy tales. "Folklore made of the wolf a creature possessed" (Lopez 1978). Stories from our past, as well as a lack of knowledge about wolves, can sustain these fears. One Ninemile respondent said, "Don't tell us wolves won't attack people--one got my uncle by the leg one time years ago and my Dad had to shoot her before she turned loose." The same person noted, "Our grand kids are afraid to play outside of the yard because of wolves that come close enough to see the whites of their eyes." Another respondent commented, "Wolves [perceive] anything within their territory as either food or a trespasser, in either case the wolf kills it."

Although some residents of Ninemile fear wolves, most people do not have a strong fear of wolves (Figure 2b). The average score of all respondents on the fear-of-wolves scale was 3.65. The lowest possible score was a 1.0, indicating strong fear, and the highest was a 5.0, demonstrating little or no fear of wolves. Education about wolves is one way to work toward eliminating peoples' fears. This should be one of the main areas of focus for children's education within or near wolf range. It has also been suggested (McIntyre 1995) that old stories and rumors of wolves attacking people should be closely examined for proof of the event. No matter what the facts are, though, people will probably believe what they were taught as children.

Hunting Interests

Residents of the Ninemile Valley who hunt have a special interest, ungulate population levels, which they perceive are affected by the wolves there. "We

put a lot of money in elk," commented one hunter, "and now you want to eliminate them." One of the main reasons why some respondents did not support wolves in Ninemile was simply stated, "Less whitetail--less elk."

Although hunters' attitudes toward wolves were examined in detail by Tucker and Pletscher (1989), Ninemile residents who hunt were less supportive of wolf presence than hunters surveyed in other studies. Ninemile residents who hunt (59.5% of all respondents) had a lower mean attitude score (2.43) than non-hunters (3.38). This low score was most likely related to the competition felt for game in the valley, as a number of surveyed people commented that a decline of deer and elk numbers was their main concern about wolf presence. Most of the resident hunters surveyed (92.4%) do hunt in the Ninemile Valley. Of all the respondents who hunt and answered the question, "Do you hope wolves continue to inhabit the Ninemile Valley?" 47.6% reported that they hoped they would, while 41.7% did not want wolves to continue inhabiting the valley, and 10.7% had no opinion.

This varied from hunters surveyed in the North Fork area of Montana, most of whom were not local residents, where 58.3% of all hunters wanted wolves to continue inhabiting that area (Tucker and Pletscher 1989). Furthermore, in a Michigan survey of attitudes toward predators, hunters had more favorable attitudes and were more sympathetic toward predators than non-hunters (Hook and Robinson 1982). Many previously surveyed hunters were probably not hunting within wolf range. For example, at the time the survey in the

North Fork was conducted, wolves were not yet fully established in the area used by hunters (Ream et al. 1988). The infrequent presence of wolves in the area could reduce perceived competition for game between humans and wolves. Although the mean attitude score for Ninemile respondents who hunt was lower than non-hunters, hunters' opinions do vary, some being pro-wolf while others are not. Some respondents actually favored wolf presence as a beneficial control of high whitetail deer numbers in the valley. One respondent commented that "the limiting factor on deer populations will probably be available food sources--not wolves."

At this time, the impact the wolves have on whitetail deer and elk numbers in Ninemile is not known. Without having researched it specifically, however, the biologist in the area stated that there does not seem to be a noticeable decline in deer numbers in the valley (M. Jimenez, Biologist, Univ. of Mont., pers. commun.). Mountain lions also prey on deer in Ninemile but, again, their impact has not been researched.

Even without data specifying the wolves' impact on ungulate populations, overwhelming concern for game in the valley (expressed in many aspects of this survey's results) was clear. Some respondents believed wolves had already reduced deer and elk numbers while others believed they will in the future. "I will be totally against wolves if the number of deer and elk drastically go down....If it gets to the point where ... there is not a healthy balance between wolves, game, and humans then the wolves should go," commented one hunter. Another respondent commented, "if game

depredation becomes more prevalent people will react to remove the wolves."

Clearly, there are many factors which could impact ungulate populations, in addition to their natural fluctuations. Mountain lions, human hunters, wolves, and changes in food resources all have the potential to reduce deer and elk numbers in the Ninemile Valley. Research projects should address the impacts of these factors and involve locals in the issues at the same time. Asking hunters to report and help determine the cause of kills they find in the woods could keep them involved in any research being conducted. Any findings on the number of deer or elk killed by wolves each year should be shared with local residents.

Livestock interests

Like hunters, livestock producers also have a special interest that is perceived to be affected by the presence of the wolf pack in Ninemile. Ranchers have long been involved in the controversies which surround wolves and they were a major force behind the elimination of wolves in Montana. "Events of the 1880s and 1890s sealed the fate of wolves in the West and sowed seeds of hatred that would sprout for generations. The combination of two critical events--the near-eradication of the bison and other big-game animals and the boom of the livestock industry--produced a prejudice that remains alive and well today" (Fischer 1995).

Ranching is no longer a predominant lifestyle in the West as it was in the

past. In Ninemile, only 16 of the 155 respondents to this survey were cattle producers. Because of their small constituency, it is easy for their opinions to go unnoticed if attitudes are defined as percentages alone. However, ranchers' opinions about wolves are among the strongest that exist.

Concern about wolves attacking livestock may be related to livestock producers' negative attitudes toward wolves. Of the 16 cattle producers who responded to the question on wolf presence in the valley, 88.2% wished wolves did not inhabit Ninemile, while 11.8% had no opinion. Cattle producers' mean attitude score (1.71) was lower than the score of other animal raisers (2.38). The low attitude score of residents who raise cattle in Ninemile is not surprising. In Bath's survey (1987), the Wyoming Stock Growers Association members also received low attitude scores toward wolves. And in Kellert's survey, "sheep producers and cattlemen expressed very negative attitudes toward the wolf ... this perception of the wolf among stockmen may be an attitude historically ingrained" (Kellert 1985). In another survey, farmers (including livestock producers) were reported as having the most negative and unsympathetic attitudes toward wolves (Kellert 1987).

Livestock owners feel they will only lose with the presence of wolves in the Ninemile Valley. Over concern for the presence of wolves, one cattle rancher described his situation, "we have long winters, long feeding seasons and little return on our investment. We just don't need anything more to have to work around." Unlike market prices and long winters, wolf presence is one of the few concerns which humans can control, and which many ranchers

feel they should be allowed to control.

Perhaps livestock owners' concern for their animals is exaggerated. At the time this survey was administered, only one steer had been killed by wolves in Ninemile. It is likely that most respondents to this survey do not know how many cattle or sheep are typically killed by wolves in other areas. In Bath's survey of Montana and Idaho residents (1990), only 26% of all respondents knew the percentage of cattle killed by wolves in Minnesota [less than 1% (Fritts 1982)]. In fact, the low number of depredations which occur in Minnesota is surprising, considering how closely wolves and livestock coexist and that farm practices encouraging wolf presence persist (Fritts 1982). The same is true of the Ninemile Valley.

However, no matter how insignificant the percentage of livestock killed by wolves appears, it must be noted that only a few ranchers experience most of the loss. For example, in Minnesota, even though depredations are not widespread, a few farmers suffer substantial losses (Fritts 1982).

Concern goes beyond economic losses however, to anxiety over a lack of control. This is a remnant of the old frontier attitude, when humans saw themselves as having not only the privilege, but the duty to manage the chaos of the wild and wildlife, some animals destroyed as pests and others protected (Allen 1979). One cattle producer in Ninemile explained his responsibility to protect his cattle from predators, it was not only his right but his *obligation* to do so. Another man explained, "my personal philosophy of

animal ownership demands that I do my best to care for and protect those animals." Finally, another respondent expressed the "heartache" a rancher would go through at the loss of an animal to wolves. "I know most non-ranchers think [of] the cows as only a monetary item, but most ranchers do care about how their animals are treated and having them harassed and killed by a pack of wolves is awful."

In addition to the obligation felt to protect their animals, some people feel it is simply their right to manage their own property. "The presence of the wolf has basically taken away the rights of the people to protect their property (pets and livestock)," one respondent commented. These feelings are further frustrated by a lack of faith in wildlife managers to control wolves when necessary. "Perhaps being able to take care of any problem that might arise on my property immediately myself would remove the opposition that I currently feel. The best way I see to coexist [with wolves] is to be able to remove problem wolves immediately--first time, every time."

Another respondent commented that she had "no faith in the system or it's actual knowledge or understanding of the problems that exist and lack of drive to do what is necessary whether the outcome may be 'politically' correct or not." Managers initial "failure to keep ... promises ... made me distrustful of all other promises made about management practices," commented another resident. Swift control (through intense monitoring, relocation, or killing) of wolves that kill livestock is probably the only way to regain peoples' faith in managers.

CHANGES IN ATTITUDES

A small number of the respondents to this survey (8%) reported having an opinion that had changed favorably toward wolves over time. Education or increased understanding of wolves was the most frequently noted reason for the change. The majority of people (62.6%), however, reported their attitude to be the same as it had been before documented wolf presence in the valley, in 1989. This may show that many people have opinions that are so strong that they will not change, or that most respondents have had no experiences (positive or negative) with the wolves in the Ninemile Valley which influenced their opinions. Some respondents noted how they simply had no opinion on wolves before wolf presence in the valley. "I think Siberian Tigers are neat to look at but I don't have much of an opinion on their management as I don't foresee their path crossing mine. My opinion of wolves was much the same."

More than 15% of the survey respondents noted that their opinions had changed to become more unfavorable toward wolves over time. Claims of declines in deer and elk numbers, mismanagement by the government, and a lack of local control over management were the main reasons for negative attitude changes. Additional reasons included: the costs of wolf recovery, concern for pets, and the experience of living within wolf range. One respondent noted how she had had "no idea the wolves would come into peoples' yards and be so <u>there</u> all the time." The fact that twice as many respondents reported changing their opinions for the worse, rather than for the better, indicates that a greater number of people believe they have been

negatively impacted by the wolves, rather than benefitted by their presence. Increasing negative attitudes may also be due to the intense media coverage and polarization of interest groups over wolf reintroduction into Yellowstone National Park and Central Idaho. In the late 1980s, there was not as much public debate over wolf recovery issues as there has been in the last several years. Wolf reintroduction and recovery have become very salient issues, perhaps encouraging people to form negative opinions toward wolves.

This survey's results on negative attitude changes imply that more attitudes will become unfavorable if more residents perceive themselves as negatively impacted by wolves or wolf management decisions. As discussed earlier, research data on the ungulate population in the Ninemile Valley could either refute or support residents' concerns. Either way, the research would be valuable to residents and wildlife managers. On the other hand, regardless of whether wolf recovery has been managed properly or not, as long as residents are dissatisfied with it wolves will lose supporters. "A vital feature of wildlife management is to gain the good will of the human society in which it is practiced" (Boitani and Zimen 1979).

Along with management, tolerated by the local people, knowledge about wolves and ecology could be helpful. Education is recommended by other attitude surveys on wolves as a means to promote tolerance of wolves (Bath 1990; Tucker and Pletscher 1989; Kellert 1987; and Llewellyn 1978). Education was directly responsible for favorably changing the minds of a few respondents to my survey. Although respondents who changed their

opinions favorably because of education generally did not specify what type of education they were referring to, schools could certainly teach wildlife and predator ecology.

It is important to note, however, that all but 8% of the respondents to this survey *did not* change their opinions or changed for the worse over time, regardless of their education or even the good public relations promoted by the biologist in Ninemile. Thus, false security should not be placed in the belief that education will change most peoples' attitudes. In fact, changes in policy have a much greater potential to impact peoples' perceptions positively or negatively. My survey showed that greater positive change, or at least limits on negative change, can be accomplished through careful management decisions than through education on wolves.

Impacts of hypothetical changes in policy

The results of this survey exposed certain scenarios related to policy, management, or wolf-related impacts, which might change a residents' attitude either favorably or unfavorably. The two management issues most likely to affect the attitudes of respondents who currently support wolf presence in Ninemile (n=76) were land use restrictions (68% may oppose wolves) and ineffective control of wolves that killed livestock (65% may oppose wolves) (Table 10). Land use restrictions were also a concern of the residents in the North Fork area. The authors concluded that recreational or commercial land use restrictions related to wolf recovery could reduce current support for wolves (Tucker and Pletscher 1989). Respondents'

concerns are valid ones. One report on wolf conservation noted the importance of restricting access to areas to help maintain ungulate populations to support wolf recovery (Tucker et al. 1990). However, the report also recognized the importance of carefully measuring the benefits of such restrictions against the negative impacts they will have on peoples' attitudes (Tucker et al. 1990).

Only 22% of the 58 respondents against wolf presence would favorably change their opinions if research showed long term deer and elk numbers were unaffected by wolves. Consistent monitoring of wolves had the potential to change 12% of the anti-wolf respondents' opinions favorably. However, most respondents who wished wolves did not inhabit Ninemile were unwilling to change their opinions given any of the scenarios (Table 11). This is another example of how the strongest opinions against wolves will probably never change. Bath (1990) had similar results in his survey of attitudes toward the reintroduction of wolves in Yellowstone. It appeared that "most respondents who do not favor reintroducing the wolf would not change their opinion regardless of the options presented to them."

People who currently support wolf presence in Ninemile are much more likely to become unfavorable toward wolves than non-supporters are likely to become favorable toward wolves (Tables 10 and 11). The group most likely to be influenced by the hypothetical policies and scenarios suggested are residents with neutral opinions (n=11) toward wolf presence (Tables 12 and 13). Land use restrictions and longterm effects on deer and elk populations

might affect 100% of the neutral respondents unfavorably. The high percentages show that people who reported having no opinion toward wolf presence could easily form an opinion opposing wolves. However, 71.4% of the neutral respondents might favor wolf presence if they felt prompt and effective control was available to handle wolf-related problems, while 58.3% might favor wolves if research showed wolves have no long term effects on deer and elk numbers.

Generally, residents of Ninemile are more likely to change their positive opinions about wolf presence to negative ones, not the other way around. Yet, respondents who had neutral opinions regarding wolf presence were those most likely to be swayed either for or against wolves given various situations and policies. Although managers hear the attitudes of the most vocal interest groups most often, neglecting to respond to the attitudes of relatively neutral or "middle of the road" people could have serious negative effects. Managers should attempt to understand the opinions of the general public, not just the vocal public. Overall, the policies most important to all respondents were those concerning land use restrictions, wolf control, and deer and elk numbers. These results give wildlife managers specific clues about how attitudes may change with various policies. The recognition that people with neutral opinions are concerned about policy changes is of particular importance.

Management policies promoting tolerance

This survey was the first to examine what potential impact community

support policies (such as contact with biologists or financial compensation from wildlife organizations) may have on increasing residents' tolerance of wolves. If support from people who want wolves can ease the concerns of people who do not, then there is a chance of raising local residents' tolerance of wolves. Two specific types of management were examined in this survey: the presence of a biologist monitoring wolves in the community and Defenders of Wildlife's livestock depredation compensation fund.

Biologists working in the community

In order to understand Ninemile residents' support of biologists working in communities within wolf range, respondents were asked to agree or disagree with the following statement: "It is a good idea to have a biologist working in areas where both wolves and people are present." Only 25.9% of the respondents disagreed, while 44.8% agreed with the presence of a biologist (Table 6).

When asked if a biologist in a community would raise residents' tolerance of wolves, similar percentages of respondents (approximately 35%) agreed and disagreed (Table 5). Of the 49 survey respondents who believed that biologists working in communities with wolves could raise residents' tolerance, 85.7% were supportive of wolf presence in Ninemile already, and of these only 16.6% reported that their opinions toward wolves had changed favorably over time. While it is difficult to measure the specific impact a biologist in the Ninemile Valley has had on residents' attitudes, it is significant that over a third of all respondents believed biologist presence was a good idea and might

raise a community's tolerance of wolves. In addition, although no respondents noted biologist presence as their reason for becoming supportive of wolves, biologists may still indirectly affect locals' behavior toward wolves. Subtle changes in locals' actions against wolves were not measured in this survey, but it is possible that less human-caused wolf mortality could result when locals are on friendly, or at least familiar, terms with local wolf researchers. A more involved study on this topic would be interesting.

Biologists were the second most frequently noted main source of information about wolves for the respondents of this survey. Tucker et al. (1990) noted that human-caused mortality of wolves could be limited by reducing peoples' misconceptions and concerns through information and education. However, even with biologists working in Ninemile and respondents considering them an important source of information about wolves, only 4% of respondents' attitudes changed positively due to education. Perhaps, instead of attempting to change attitudes through education, local biologists can promote tolerance through good public relations. It is possible that a biologist working within a community like Ninemile could take on this role informally.

Boitani and Zimen (1979) emphasized the importance of good relations between researchers and the community in which they work. The goal is that local people trust and rely on researchers for assistance (Boitani and Zimen 1979). This had generally been the case in Ninemile with the wolf biologist there. A number of respondents noted how he had been "doing a good job," etc. Others complained that he was no longer around, as he was not working

in the area during the time this survey was administered.

The presence of a biologist who is willing to spend time with locals in communities like Ninemile is one way to work toward residents' tolerance of wolves, or at least wildlife managers. A biologist may be able to ease feelings of mistrust and mismanagement, they can be readily available if any wolf-related problems do occur, and can spend time getting to know locals' attitudes on relevant policies. In addition, researchers can share information about the habits of the wolf pack, keeping locals informed and involved. To foster genuine contacts and communication with local residents, scientists must have a sincere interest in locals' opinions, excellent listening skills, and humility. Unfortunately, these communication and social skills are not taught to all research biologists. Several respondents commented that only a "good" biologist could raise peoples' tolerance of wolves. Only biologists who have these skills and recognize the importance of local support should be working on issues as sensitive as wolf recovery.

Defenders of Wildlife compensation program

Efforts have been made to ease rancher's dislike of wolves and promote wolf recovery in the Rocky Mountains. In 1987 a private fund was created by the Defenders of Wildlife to compensate people who lose livestock to wolves. Defenders believed that if wolf supporters covered the costs of livestock killed by wolves that ranchers would be less hostile and more tolerant of wolves (Defenders 1994). However, respondents to this survey who wished wolves were not present in Ninemile (cattle producers being among this group)

seemed particularly determined not to change their minds, regardless of outside support (Table 11). One statement on the survey examined this directly: "The program for financial reimbursement of verified wolf-related livestock depredation makes the presence of wolves in the Ninemile Valley easier to tolerate." (Table 7).

The results showed the program is valuable to some respondents, as 38% felt it raised tolerance of wolves. Of these 52 respondents, however, 75% were already favorable toward wolf presence, and of these people, only 7.6% reported their attitudes had changed favorably over time. Most respondents who disagreed that the program raises tolerance did so strongly (25.5%) and had a low mean attitude score (1.68). Furthermore, of the 16 cattle producers who responded to this survey, 56.2% of them strongly disagreed that the program made wolves more tolerable, while 31.2% thought it did. This is particularly interesting since the program affects livestock producers more than any other residents and its objective is to promote ranchers' tolerance specifically.

When respondents were given hypothetical policy changes that might affect their opinions, the value of the program reappeared (Table 10 and 12). More than 40% of the respondents who support wolf presence, and 54.5% of the respondents who are neutral reported they would change their minds and oppose wolf presence if the compensation program ended. These results demonstrate strong support of the compensation program from respondents unaffected by it and who do not raise livestock. One of the reasons for such

support could be that some people are concerned with the fairness of management decisions. Supporters of the compensation program may believe livestock producers suffer hardship through wolf presence and the potential for livestock depredation. Thus, some pro-wolf and neutral respondents may feel the compensation fund is one way to make wolves more tolerable for livestock producers. Clearly, the program is important enough to many respondents that they will oppose wolf presence without it. This demonstrates how the impacts of management reach far beyond the audience targetted initially.

The fact that most of the target audience, livestock producers, disagreed that the program has raised tolerance of wolves may show how some attitudes are too strong for any program to change. It is also possible that some residents believe ranchers are not fully compensated for all their losses, explaining why a total of 35% of all respondents feel the program has not increased tolerance toward wolves (Table 7).

The fund does not eliminate all economic impacts suffered by ranchers whose livestock are killed by wolves. It will not cover the potential value of a breeding cow to the future herd over time. Defenders of Wildlife does recognize this deficiency however. "It is impossible to develop a program that completely insulates ranchers from all wolf-caused impacts. The intent of our program is to address the primary concern articulated most frequently by ranchers--actual livestock losses" (Defenders 1994).

"Economics makes [livestock producers] hate the wolf....Pay them for their lost livestock, and the controversy would subside." (Mott as quoted in Fischer 1995). As discussed earlier, however, there are burdens and concerns (such as a rancher's obligation to protect his livestock from predators) that cannot be reimbursed. The fact that almost half (49.3%) of the respondents felt the compensation for livestock losses was inadequate may expose this (Table 9). Considering cattle ranchers only make up 10% of all the respondents to this survey, these results also show how other residents in the area do have opinions on policies which do not directly affect them. Again, it may be that issues concerning the fairness of a management policy are influencing the opinions of respondents not directly affected by the program. These results also demonstrated how the compensation fund may not be viewed as a program which has eliminated the burden put on ranchers by wolves, even if it does make wolves more tolerable than if there was no fund at all.

Some respondents complained that the money in the fund would not last, that depredations are rarely "verified" as wolf-related, that verification should be done by residents (not wildlife agencies or biologists), and that this fund was coming out of their tax dollars. These complaints may contribute to continued intolerance of wolves despite the benefits of the compensation program. Perhaps more information on the fund (such as the fact that the fund is supported by private donations) would promote greater support.

One issue that did not come up about the fund is that it may no longer exist once the wolf is delisted from the endangered species list. Residents are

probably not aware of this possibility. If anything, it seems that such a fund will be more necessary as wolf numbers increase. Managers should expect a serious outcry once wolves numbers have recovered, depredations occur, and there is no longer a fund available to reimburse livestock producers. Not only would this increase ranchers distrust of management, but many current wolf supporters and residents with no opinion may oppose wolves based on the elimination of the compensation fund (Tables 10 and 12). This may be the most far reaching negative impact of the withdrawl of the compensation fund.

There are plans to reassess the need for the fund after wolves are delisted (H. Fischer, Regional Director, Defenders of Wildlife, Missoula, Mont., pers. commun.). But even if the fund is reinstated it is the insecurity of its availability and the process of its reassessment which will infuriate locals. At this time, residents are correct in worrying that the fund may not be around forever. This issue is a perfect example of why some people feel promises made by managers are promises broken, increasing mistrust of wildlife managers and environmental groups.

Policies people support

Without an understanding of what policies local people within wolf range support, appropriate management decisions cannot be made. Disregarding public opinion and simply establishing laws to enforce management decisions will lead to the publics' defiance of the law and the disillusionment of managers (Boitani and Zimen 1979).

Increase in wolf numbers and harvest seasons

Two questions addressed respondents' opinions on policy related to increasing numbers of wolves. "If the number of wolves in Montana reaches the recovery goal numbers stated in the Rocky Mountain Wolf Recovery Plan (as developed by the U. S. Fish and Wildlife Service), a regulated harvest season for wolves should be opened" and "To keep a pack of wolves from reaching the highest number the land can naturally support, some wolves from that pack should be relocated out of the area" (Tables 15 and 14).

In both questions regarding wolf numbers the majority of respondents, agreed with the proposed management policy. In one case, 55.7% of respondents supported the relocation of some wolves if they reached their carrying capacity in one area. Respondents (60.2%) also supported a harvest season if wolf numbers in Montana reach recovery goals. Support for both these policies appeared to be strong.

Funding and research

Cost was an important issue with people dissatisfied with wolf management. One respondent commented, "the government spends too much money and time studying ... wolves....Let them take care of themselves." Some people felt they were forced to pay for something that they did not want and which would cost them even more money later. A lot of comments seemed to be referring to the reintroduction of wolves in Idaho and Yellowstone, however. Additionally, many respondents felt that the wolves in Ninemile were reintroduced and are particularly frustrated because of it. Some respondents

commented that the people who want wolves should be the ones paying for them. From some residents' perspective, first they pay taxes to support wolf recovery, then they suffer hardship through loss of livestock or pets, and eventually, game numbers go down. One resident questioned, "Where are the benefits to wolf recovery?"

A partial solution to the issue of cost is better information on spending. People may not know how much of their tax money really goes into wolf recovery. From the summary of rules on experimental wolf populations, about 30 cents from each person in the U. S. paid for wolf reintroduction (USFWS Fall 1995). However, this does not ease the frustration of the people who read that the program cost $6 million and feel that *n o* money should have been spent. Any projects that are paid for privately must emphasize that fact. This is particularly important for compensation funds such as the one offered by the Defenders of Wildlife. When asked who should fund wolf research projects, most respondents to this survey chose private interest groups, rather than the U. S. Fish and Wildlife Service or the Montana Department of Fish, Wildlife, and Parks. Even though many Ninemile residents were unwilling to see their tax dollars or hunting license fees support wolf research, 42.3% of the survey respondents felt research on wolves should be conducted (Table 20). Establishing monitoring programs and research studies in communities like Ninemile to measure the impacts of wolves on residents, domestic animals, and the local prey, could also keep biologists in touch with the community's needs.

Livestock depredation and pet loss policy

Concern over threats to livestock and pets were important factors behind peoples' opinions about wolf presence in Ninemile. However, in response to questions about direct wolf control policies concerning these issues, most people did not choose extreme measures. Many respondents (40.3%) wanted wolves that kill livestock for the first time to be monitored, rather than relocated or killed (Table 16). "Wolves sole existence in life is to sustain their lives and feed their young. Why should they be killed [if they kill livestock]," one person remarked. Responses to policies concerning wolves that kill pets were similar (Table 17). However, the current policies in Montana for dealing with wolf-livestock conflicts and wolf-pet conflicts differ.

The current policy for handling wolf-livestock conflicts is to relocate a wolf which kills livestock once to another area. If it continues to kill livestock it may be trapped and killed. There is no action taken against a wolf which kills someone's pet, however (E. Bangs, Wolf Recovery Coordinator, USFWS, Helena, Mont., pers. commun.). In Minnesota, if a wolf kills pets, Federal Animal Damage Control will capture and kill the wolf (E. Boggess, Minnesota Dept. of Nat. Resources, pers. commun.). Wolf management policies in Minnesota vary from those in other states because wolves are listed as threatened, rather than endangered.

Some Ninemile residents suggested other solutions to pet-wolf conflicts (Appendix 6), yet the most common comments were that nothing should be done to the wolf and that the pet-owner should be blamed. One respondent

said, "since we live in a place like the Ninemile we have to know [pet loss] will happen."

Perhaps making residents more aware of danger to their pets and what actions they can take to limit conflicts would help. At the time this survey was administered, four dogs had been killed by wolves (M. Jimenez, Biologist, Univ. of Mont., pers. commun.). At least three of these dogs were killed at night, though other peoples' pets had been attacked by wolves during the day. Many people may not like the idea of restricting their pets during the day or keeping them inside at night, even if these actions minimized the possibility of wolves attacking their pets. Ideally, once residents in communities with predators understand how to minimize conflicts, they should also become aware of their responsibility to change their behavior to protect their pets.

There are some management policies which could minimize the frustration of people whose pets are killed by wolves. Many people surveyed in Ninemile (50%) believed that owners of pets killed by wolves should be reimbursed (Table 18). Other respondents disagreed or questioned how money could make up for the loss of a pet. "No cost can be put on a pet's devotion and emotional well being to a family." Because pets are like family members, monetary reimbursement won't really work, said one man whose dog had been killed by wolves, "you can't just replace a sister." Even so, he did support a token reimbursement for pets, "not for the money, but for the acknowledgment of the loss."

Finding a way to recognize peoples' loss of a pet, without assuming that money will eliminate angry feelings, may at least ease some peoples' current dissatisfaction with the lack of a policy on wolf-pet conflicts. Ideally, informing people on how to reduce the chance of conflicts will lower the number of pets killed by wolves. If specific actions limit wolf-pet conflicts, than these should be encouraged, not wolf control.

Minimizing wolf-livestock conflicts should also be encourged. Fritts (1982 and 1992) listed three animal husbandry practices related to depredation problems in Minnesota: dumping old livestock carcasses in pastures, allowing calving on pastureland, and giving livestock access to large wooded areas. Changing animal husbandry practices such as these is necessary in communities like Ninemile, but will not occur if they are not economically realistic (Fritts 1992).

Perhaps, along with information programs on these practices, aid from county extension agents or private conservation groups could be offered. If these options exist and the land owner is still negligent, wolf control should be denied and changes in farm practices recommended if depredations occur. This is the policy in British Columbia when irresponsible husbandry practices result in livestock depredation by wolves (Tompa 1983a, 1983b). Furthermore, Fritts (1992) recommended that compensation for livestock be withheld in similar cases, providing incentive for livestock producers to improve husbandry practices. There will be times, however, when depredations occur despite ranchers' efforts to minimize risks to their

livestock. This is when agencies must offer quick and effective control of wolves.

Predator Control

Predator control in any context is a sensitive subject to many pro-wolf people. Many wolf recovery managers and biologists support it, understanding the consequences on some locals' attitudes if wolves that kill livestock are not relocated or killed. In a Minnesota survey, most respondents were supportive of the right to kill wolves which kill pets and the right to "protect" livestock from wolves (Kellert 1987). "The best way to ensure continued wolf survival is, ironically enough, not to protect wolves completely. If we carefully regulate wolf populations instead of overprotecting them, we can prevent a second wave of wolf hysteria, a backlash that could lead once again to persecution" (Mech 1995 as cited in Fischer 1995).

Even when wolf numbers in the West are restored there is no reason to suppose that large numbers of wolves will need to be killed to control livestock depredation since wolf problems are often localized and concern only a few wolves (Fritts 1982). Because livestock producers do have the most to lose through wolf recovery, it is essential that wolf recovery advocates are willing to remove or destroy wolves which kill livestock (Fischer 1995). This may be a short term compromise that will promote greater trust and communication between the livestock industry and conservation groups. In the long term, perhaps more ecologically centered values will promote the acceptance, rather than the control, of predator impacts on humans. This is

not the current prevailing attitude, however.

CONCLUSIONS AND MANAGEMENT RECOMMENDATIONS

Human-caused wolf mortality is an important factor in wolf recovery in the West (USFWS 1987) and may be driven in part by intolerant attitudes toward wolves. Of equal importance is the fact that peoples' attitudes can change for the better, or more typically, for the worse. Wolf management policies, changes in local game numbers, and the impact wolves have on domestic animals can all affect the opinions of residents within wolf range.

To reach the goals of wolf recovery, managers need to take all the factors which influence residents attitudes into consideration as policies are defined. Long term and short term efforts can be made to positively influence peoples' attitudes. Short term goals should include minimizing negative impacts on locals by effectively addressing wolf-human conflicts, limiting restrictive policies on land use, in addition to maintaining current programs which promote tolerance of wolves. Long term goals should include informal public relations efforts in rural communities and education in schools about wolves, ecology, and conservation values.

Education and public relations

Education can address and dispel some peoples' fears about wolves, explore wolves' role in the natural ecosystem, and teach people that wolves are just another animal, not the cruel killers of our folk tales (Tucker et al. 1990;

Boitani and Zimen 1979). Because a lack of knowledge may sustain fear and intolerance of wolves, and intolerance may lead to illegal killing, Tucker et al. (1990) conclude that public information and education programs may limit human-caused wolf mortality.

Many of the wolf supporters in this survey demonstrated values founded on an ecological view of wildlife, supported by an understanding of ecology and a belief that wolves have a role in the ecosystem. A sympathetic attitude toward predators might have to be developed from childhood, but an understanding of ecology and an introduction to conservation values can be fostered in schools. While education may be effectively aimed at children in schools, in may be inappropriate for adults. As the results of this study demonstrated, few opinions changed positively overtime and the attitudes of respondents against wolf presence did not appear likely to change due to education. Adults may simply be more set in their views of predators than children. Even with informal sources of information (biologists) available, education efforts, aimed at locals, cannot be expected to change many attitudes toward wolves.

In Ninemile, biologists studying wolves were the second most important source of information for residents and some residents believed that the presence of a biologist can raise tolerance toward wolves. While biologists conduct research in communities within wolf range they can meet and maintain contact with the local residents. This supplies residents, as well as biologists, with the opportunity to share information on wolves and discuss

management issues. Although this sharing of information may educate the public, it acts more importantly as an indirect form of public relations. The benefits of a well-liked biologist monitoring wolves in a local community include increased local involvement in wolf research and management and enhanced communication and trust between locals and wildlife managers. This type of "public relations work aims at securing the essential cooperation, sympathy, or at least tolerance of the local people for wildlife conservation" (Boitani and Zimen 1979).

It is not realistic to expect or recommend that a biologist conduct research in all the rural communities where wolves show up. However, if a federal or state biologist was required to monitor wolves inhabiting areas close to people, allowing additional time to meet with local residents would be recommended. Over time, good public relations and communication between wildlife managers and local residents might ease some of the frustration people have with wolf recovery and the politics of wolf management.

Public relations can clear up misunderstandings about management policies and offer information about livestock depredation and how to minimize risk to domestic animals. Yet, information and public relations are in no way the answers to all the problems associated with wolf-human conflicts. At best, they could translate some peoples' negative attitudes toward wolves into tolerance of wolves. Ultimately though, it is management which will have the greatest impact on local residents' opinions.

Wolf management policies

Of critical importance is wildlife managers' recognition that locals who are not directly impacted by wolves still have opinions regarding wolf management. For example, many respondents who were not raising livestock still had opinions on the livestock depredation compensation program and said they might oppose wolf presence if the program ended. Peoples' perception of the fairness of management policy appears to influence their attitudes toward wolves, regardless of whether or not the policy affects them personally. Furthermore, respondents who were neutral concerning wolf presence in Ninemile were the group of respondents most likely to be swayed in response to management decisions. If management decisions are made with the objective of positively influencing peoples' attitudes, learning and responding to the opinions of neutral residents will be the most effective. The opinions of residents who do not have strong attitudes need to be considered when management decisions are made.

Wolf compensation fund

The Defenders of Wildlife wolf compensation fund was viewed by some Ninemile residents as a management policy which promotes local tolerance of wolves. Programs such as this answer many peoples' demand for environmentalists to "put your money where your mouth is." However, it is important to note that the majority of respondents affected directly by this policy (livestock producers) do not feel the program has raised tolerance. Much of the value of the program rests in its support by pro-wolf and neutral

respondents. If the program ends many of these respondents may oppose wolves. Support of the program by "anti-wolf" residents may increase if some improvements are made.

Because the Defenders of Wildlife wishes to eliminate economic burden to livestock producers, they should consider recognizing the true value of a breeding cow's contribution to the future herd. More significantly, the program should be guaranteed beyond wolf recovery. Once the wolf is removed from the endangered species list, fears of livestock producers will come true if the fund is eliminated. At this time, the fund is only guaranteed while the wolf remains endangered. Once wolves are delisted, the Defenders of Wildlife will reassess the need for the fund and decide then whether or not to continue the compensation program (H. Fischer, Regional director, Defenders of Wildlife, Missoula, Mont., pers. commun).

It is the USFWS's plan that the state department of Fish, Wildlife, and Parks eventually controls wolf management policy. How the state of Montana will manage wolves in the future is "impossible to define at this time" (G. Marx, Montana Governor's Office, Helena, Mont., pers. commun.). Yet, establishment of a fund is highly unlikely as no fund currently exists to compensate ranchers for damages caused by any other predators. At the same time, the question of who should pay for predator-related losses persists. If wolf recovery is successful in Montana, and wolf-livestock conflicts occur, some sort of compensation will be expected. If no fund is available a well-deserved outcry from many people, not just livestock owners, should be

expected. Elimination of the fund will almost certainly result in greater intolerance of both, wolves and wildlife managers.

General policies

Residents of the Ninemile Valley seemed frustrated over their lack of control over their own property when it came to wolves. In time, when wolves are not endangered, restrictions will probably become more lenient. This could be beneficial as long as there is some regulation and monitoring to prevent extreme measures against wolves. Meanwhile, wildlife managers should be available to assist with wolf-related problems so residents do not have to take matters into their own hands. Active communication with wildlife managers may also minimize residents' concerns over mismanagement. In addition, conflicts which do occur will need to be addressed swiftly in order to restore some faith in wildlife agencies' management capabilities.

Wolf control or relocation will be required at times to satisfy local residents. Most respondents supported a regulated harvest season after wolf recovery, wolf relocation to prevent wolves from reaching their carrying capacity in one area, and a reimbursement program for pets killed by wolves. In addition, although many residents in Ninemile wanted wolves that kill livestock for the first time to be monitored, 21.5% of the respondents believed the wolf should be killed. Whichever approach is chosen should depend on the circumstances of the conflict and, to a certain degree, the attitudes of the local community. This means that policy should be somewhat flexible while still remaining consistent with the broad objectives of wolf recovery.

Residents' and hunters' concerns over perceived declines in deer and elk numbers caused by wolves should be addressed through research. The impact mountain lions have on game numbers in the Ninemile Valley would also be useful to study. If research on predators' impacts on game is conducted, local hunters should be invited to participate in some manner, even if it is just to report discovered kills. This would allow people affected by predators to have some control and understanding of the situation. An important additional note on research is that although it was supported by many residents, private funding sources were preferred.

Management policies can affect peoples' attitudes and attitudes, if affected negatively, could lead to intolerance of wolves. Listening to the concerns of local residents within wolf range, acting on their management needs, and developing a reasonable management plan to do this, are essential while working toward wolf recovery.

In conclusion, this survey exposed some critical issues involved when humans and wolves are inhabiting the same area. These issues will continue to be important for wolf recovery in the West. However, care should be taken if the results from this survey are applied to other rural communities within wolf range. A number of influential factors will vary outside of the Ninemile Valley: the number of hunters or livestock producers living in the community, the number of years wolves have been present, and how game numbers in that area have been affected by wolves or other factors, for example.

APPENDIX 1

Ninemile correspondence: introductory postcard and letter, cover letter and questionnaire, and reminder letter

March 4, 1996--Introductory Postcard

Please check the topics you would most like to see on the questionnaire I will send to you or write in other ideas you have.

___ Wolf Management Policy
___ Livestock Depredation
___ Ninemile Wolf Research Project
___ Wolves and Pets
____Other_____
_____

March 4, 1996

Dear Ninemile Valley Resident,

I am a graduate student at the University of Montana and I also work on the wolf research project in the Ninemile Valley. As a part of my studies at U of M I am planning to send a questionnaire to you about your opinion on the wolves which inhabit the Ninemile Valley and wolf management policy. Too often, local residents are left out of the decision making process by wildlife agencies. The questionnaire I will send you will give you a chance to anonymously voice your input, concerns, and ideas about wolf management in your community.

Please consider this letter an invitation to become involved in the project. As I put together the questionnaire, I would like to be sure to include the aspects of wolf management in the Ninemile Valley which are most important to you. Any ideas you have about wolf presence in the valley, concerns about wolves, wolf management policy, or the wolf research project being conducted in the Ninemile are welcome. I will do my best to incorporate your ideas into the questionnaire I'm creating. This way, the results of the entire study will be much more meaningful to you and to others who read about it.

All you need to do is check off the topics most interesting to you on enclosed postage-paid and addressed postcard and return it to me. If you have any questions at all about the questionnaire or the project please feel free to give me a call at: 543-0732.

Thanks for your help!

Sincerely,

Rachel Wolstenholme
Graduate Student
University of Montana

April 2, 1996

Dear Ninemile Valley Resident,

As you may know I am conducting a survey about local residents' opinions about both the wolves which live in the Ninemile Valley and wolf management policy. If you had a chance to comment on and return the postcard I previously sent to you I would like to thank you. I received over 95 responses and have tried to include your comments and concerns in the questionnaire enclosed.

Because local residents are often not involved in making wildlife management decisions, it is very important that you reply, whether you have strong opinions about wolves or not. The results from this survey will be sent to wildlife agencies to enable them to better respond to your comments, concerns, and ideas regarding wolf management in your community.

Please be assured that all of your responses will remain totally confidential. The number on the questionnaire is for mailing purposes only. As soon as your questionnaire is returned your name and address will be deleted from the list of surveyed residents so you can never be associated with your answers.

After you have completed the questionnaire please return it to me as soon as possible in the enclosed stamped and addressed envelope. If you have any questions at all regarding this project please phone me at 543-0732. Finally, if you are interested in the results of the survey, I plan to post them in the Frenchtown and Alberton Newsletters in a few months.

Thanks for your help!

Sincerely,

Rachel Wolstenholme
Graduate Student
University of Montana

Part One

The following questions are about your experiences with and opinion toward wolves in the Ninemile Valley. Please circle the number next to the answer best for you.

1. Before receiving this questionnaire were you aware that wolves inhabit the Ninemile Valley?
   1 YES
   2 NO

2. Do you know there has been a research project on the wolves in the Ninemile Valley?
   1 YES
   2 NO

3. Are you aware that there is a program of financial compensation for livestock losses which are verified as wolf-related?
   1 YES
   2 NO

4. Have you seen wolves in the Ninemile Valley?
   1 YES
   2 NO
   3 I DON'T KNOW

5. Do you hope wolves continue to inhabit the Ninemile Valley?
   1 YES.....if YES, please go to **Part Two**
   2 NO.....if NO, please go to **Part Three**
   3 NO OPINION.....if NO OPINION, please go to **Part Four**

Part Two

If you hope wolves continue to inhabit the Ninemile Valley, please circle YES after any of the situations below that might change your opinion or circle NO after any of the situations that would not change your opinion.	**YES, MY OPINION MIGHT CHANGE**	**NO, MY OPINION WOULD NOT CHANGE**
1. If the program for compensation for wolf-related livestock depredation ends.	YES	NO
2. If all monitoring by research biologists ends.	YES	NO
3. If one of your pets is killed by wolves.	YES	NO
4. If research studies show that wolves have long term effects on deer and elk numbers.	YES	NO
5. If the number of wolves in the valley increases substantially.	YES	NO
6. If wolf presence in the Ninemile Valley resulted in significant land use restrictions.	YES	NO
7. If wolves that kill livestock were not controlled quickly or effectively.	YES	NO

8. Another situation that might change your mind is:

(NOW PLEASE SKIP TO **PART FIVE**, PAGE 3)

Part Three

If you wish wolves did not live in the Ninemile Valley, please circle YES after any of the situations below that might change your opinion or circle NO after any of the situations that would not change your opinion.	YES, MY OPINION MIGHT CHANGE	NO, MY OPINION WOULD NOT CHANGE
1. If residents still receive reimbursement for livestock losses even when they *cannot* be verified as wolf related.	YES	NO
2. If wolves that killed pets were killed or otherwise removed.	YES	NO
3. If prompt and effective control was available to handle wolf-related problems.	YES	NO
4. If research studies showed that wolves have no longterm effects on deer and elk numbers.	YES	NO
5. If wolves were monitored on a monthly basis all year round.	YES	NO
6. If residents received $5000 when wolves successfully denned on their property.	YES	NO

7. Another situation that might change my mind is:

(PLEASE SKIP TO **PART FIVE**, PAGE 3)

Part Four

A. If you presently do not have an opinion about wolves inhabiting the Ninemile Valley, please circle OPPOSE by any of the situations described below which would make you *oppose* wolf presence or circle NO if the situation would not influence your present opinion.

1. If the program for compensation for wolf-related livestock depredation ends.	OPPOSE	NO
2. If all monitoring by research biologists ends.	OPPOSE	NO
3. If one of your pets is killed by wolves.	OPPOSE	NO
4. If research studies show that wolves have long term effects on deer and elk numbers.	OPPOSE	NO
5. If the number of wolves in the valley increases substantially.	OPPOSE	NO
6. If wolf presence in the Ninemile Valley resulted in significant land use restrictions.	OPPOSE	NO
7. If wolves that kill livestock were not controlled quickly or effectively.	OPPOSE	NO

8. Another situation that might make you oppose wolf presence in the Ninemile Valley is:

B. Now, please circle FAVOR by the situations described below which might make you *favor* wolf presence or circle NO by situations which would not influence your present opinion.

1. If residents still receive reimbursement for livestock losses even when they *cannot* be verified as wolf related.	FAVOR	NO
2. If wolves that killed pets were killed or otherwise removed.	FAVOR	NO

Part Four...Continued

3. If prompt and effective control was available to handle wolf-related problems.	FAVOR	NO
4. If research studies showed that wolves have no longterm effects on deer and elk numbers.	FAVOR	NO
5. If wolves were monitored on a monthly basis all year round.	FAVOR	NO
6. If residents received $5000 when wolves successfully denned on their property.	FAVOR	NO

7. Another situation that might make you favor wolf presence in the Ninemile Valley is:

(PLEASE GO TO **PART FIVE**)

Part Five

Please give us your opinion on each of the statements below by *circling* the number you feel is best when 1 = Strongly Agree and 5 = Strongly Disagree. There are no right or wrong answers, we would just like to hear your thoughts on wolves and wolf management policy.

	Strongly Agree				Strongly Disagree
1. Wolves and humans are natural enemies that cannot coexist.	1	2	3	4	5
2. Wolves help maintain balanced wildlife populations in the Ninemile Valley.	1	2	3	4	5
3. If there was anything I could do to have the wolves removed from the Ninemile Valley I would do it.	1	2	3	4	5
4. The thought of seeing a wolf in the wild is exciting.	1	2	3	4	5
5. Wolves in the woods can often be dangerous to humans.	1	2	3	4	5
6. It's wrong to hunt wolves for furs even where they are common.	1	2	3	4	5
7. It is only a matter of time before wolves kill livestock again in the Ninemile Valley.	1	2	3	4	5
8. Wolves and grizzly bears are equally dangerous to humans.	1	2	3	4	5
9. Wolves deplete game (deer and elk) numbers to unacceptable levels in the Ninemile Valley.	1	2	3	4	5

	Strongly Agree				Strongly Disagree
10. Having a biologist work in areas where both wolves and humans are present would lead to greater acceptance of wolves by local residents.	1	2	3	4	5
11. When wolves inhabit areas close to people, it is important to conduct research projects to study wolf movements.	1	2	3	4	5
12. It is a good idea to have a biologist working in areas where both wolves and people are present.	1	2	3	4	5
13. If pets are killed by wolves the owners should be reimbursed for their losses.	1	2	3	4	5
14. The program for financial reimbursement of verified wolf-related livestock depredation makes the presence of wolves in the Ninemile Valley easier to tolerate.	1	2	3	4	5
15. Reimbursement for the market value of a cow killed by wolves is not enough to make up for *both* the loss of the cow *and* the inconvenience to the rancher.	1	2	3	4	5
16. To keep a pack of wolves from reaching the highest number the land can naturally support, some wolves from that pack should be relocated out of the area.	1	2	3	4	5
17. If the number of wolves in Montana reaches the recovery goal numbers stated in the Rocky Mountain Wolf Recovery Plan (as developed by the US Fish and Wildlife Service), a regulated harvest season for wolves should be opened.	1	2	3	4	5

Part Six

These next questions are also about your opinions on wolf management policy. Please circle the number of the answer you feel is best.

1. If research must be conducted on wolves in Montana, it should be funded by
   1 U.S. Fish and Wildlife Service (Federal Tax Dollars)
   2 Montana Department of Fish Wildlife and Parks (Hunting License Fees)
   3 Private interest groups
   4 Other: (please specify)_____

2. If a wolf kills livestock for the first time, that wolf should be
   1 monitored closely by biologists
   2 relocated to another area where there are no livestock
   3 killed
   4 other: (please specify)_____

3. If a wolf kills pets, that wolf should be
   1 monitored closely by biologists
   2 relocated to another area
   3 killed
   4 other: (please specify) _____

4. Are you aware that wolf management decisions will eventually be transferred from federal to state control?
   1 YES
   2 NO

5. Once wolf management decisions are transferred from federal to state control, service to local residents will...
   1 increase
   2 stay the same
   3 decrease
   4 I'm not sure

6. Please circle the *one* type of information source below where you obtain most of your information about wolves.
   1 friends and relatives
   2 magazines
   3 movies
   4 books
   5 public meetings
   6 newspapers
   7 television
   8 scientific papers
   9 personal experience
   10 biologists studying wolves
   11 other: (please specify) _____

7. Eight or more years ago, *before wolf presence in the Ninemile Valley,* your opinion of wolves was...
   1 less favorable than it is now
   2 the same as it is now
   3 more favorable than now
   4 I don't know

8. If your attitude toward wolves has changed over time, what is the main reason for the change?

   _____

9. If any factor has made the wolves in the Ninemile Valley more or less tolerable for you, please describe it here:

   _____

10. If you hope wolves continue to inhabit the Ninemile Valley, what is your main reason for supporting the presence of wolves in the valley?

    _____

11. If you wish wolves were not present in the Ninemile Valley, what is your main reason for opposing wolf presence in the valley?

    _____

Part Seven

In conclusion, we have a few questions about you personally. Remember, all information will be kept strictly confidential and your answers will be grouped with those of other respondents so you cannot be identified, so please be frank.

1. How many years have you lived in the Ninemile Valley? _____ years

2. About how much time have you spent *each* year in the Ninemile Valley in the last 5 years?
   1 30 days or less
   2 1-6 months
   3 over 6 months

3. Please indicate your sex:
   1 Male
   2 Female

4. Please indicate your age:
   1 18-27
   2 28-37
   3 38-47
   4 48-57
   5 58-67
   6 68 or older

5. Please circle the number of the highest grade level of formal education you have completed so far.
   1 2 3 4 5 6 7 8 elementary 9 10 11 12 highschool 13 14 15 16 college 17+ graduate school

6. Are you currently raising animals for food or sale?
   1 NO

   2 YES.....if yes, please put a check by the type of animals you raise
   ___ cattle ___chickens ___sheep ___goats ___other:_____

7. Are you a hunter?
   1 NO

   2 YES.....if yes, do you hunt in the Ninemile Valley? Please circle: YES NO

8. Are you a pet owner?
   1 NO

   2 YES.....if yes please check the type of pet you have
   ___dog ___cat ___horse ___other: _____

Thank you for completing this questionnaire. Please mail it back to me as soon as possible in the enclosed stamped and addressed envelope. Your opinions are very important so you can expect a reminder if I do not hear from you. If you are interested in the results of this project, I plan to post them in the Frenchtown and Alberton Newsletters in several months.

I am interested in any additional comments you have about wolf presence in the Ninemile Valley, please describe them briefly here or attach another sheet of paper if needed. Thank You!

May 2, 1996

Dear Ninemile Valley Resident,

I am writing to let you know that I have not yet received your response to the survey on wolves and wolf management policy in the Ninemile Valley. Although half of the residents in the valley have already returned their questionnaires the sentiments of the Ninemile community will not be accurately represented without your response as well.

No matter how you feel about the subject, whether you want wolves to remain in the Ninemile Valley or wish they were not present at all, your opinion is very valuable.

Because you live within wolf range your experiences and insight into the issues of wolf management extend far beyond those of other citizens. Offering your opinion on wolf management will enable wildlife managers to better understand your needs and those of the community.

I realize your schedule must be busy but if you could take a moment to fill out the enclosed questionnaire and return it to me as soon as possible I would appreciate it enormously. If you have any questions at all about this project please feel free to phone me at: 543-0732.

Thank you,

Rachel Wolstenholme
Graduate Student
University of Montana

APPENDIX 2

List of Advisors and questionnaire reviewers

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APPENDIX 3

Attitude and Fear-of-wolves scale variables, factor loading, and reliability analysis. Detailed explanation of factor loading and reliability analysis is in the Methods section of the thesis.

Attitude statements and factor loading:

Wolves help maintain balanced wildlife populations in the Ninemile. (.79879)

If there were anything I could do to have the wolves removed from the Ninemile Valley I would do it. (.86644)

It's wrong to hunt wolves for furs even where they are common. (.56622)

It is only a matter of time before wolves kill livestock again in the Ninemile Valley. (.69737)

Wolves deplete game (deer and elk) numbers to unacceptable levels in the Ninemile Valley. (.72319)

Attitude scale reliability analysis: alpha=.8735

Attitude questions not used in scale development:

The thought of seeing a wolf in the wild is exciting.

Wolves and humans are natural enemies that cannot coexist.

Fear-of-wolves statements and factor loading:

Wolves and grizzly bears are equally dangerous to humans. (.91974)

Wolves in the woods can often be dangerous to humans. (.91974)

Fear-of-wolves scale reliability analysis: alpha=.8178

APPENDIX 4

Changes in attitude over time

Comments are in response to the question, "If your attitude toward wolves has changed over time, what is the main reason for the change?" Each set of comments are grouped depending on whether the respondent wanted wolves to remain in the Ninemile Valley, wished they were not present, or had no opinion about wolf presence. The number after each comment designates the number of people who wrote that comment. If there is no number then only one person made that comment.

People with no opinion about wolf presence (n=11)

Unfavorable change of opinion
- Cost
- Danger/threat from wolves
- Humans cannot defend their property

Favorable change of opinion
- Wolves are no threat to livestock
- Wolves are no threat to game

People who support wolf presence in the valley (n=76)

Unfavorable change of opinion
- Less deer 2
- No good compensation program
- People making money off wolves
- Against reintroduction

Favorable change of opinion
- Education or people a better understanding of wolves 7
- Living in MT and the Ninemile 5
- Wolves belong/coexist in the Ninemile 3

People who do not support wolf presence in the valley (n=58)

Unfavorable change of opinion

- Concern for loss of pets 3
- Game numbers declining 9
- Mismanagement by government and small interest groups (no local control) 8
- Cost 4
- Miscellaneous 2
- Experience of having wolves in Ninemile 3
- Belief that wolves were reintroduced into Ninemile
- Wolf numbers increasing
- Concern for livestock
- Wolves are dangerous

APPENDIX 5

Other comments respondents listed might change their minds about wolves.

Each set of comments are grouped depending on whether the respondent wanted wolves to remain in the Ninemile Valley, wished they were not present, or had no opinion about wolf presence. The number after each comment designates the number of people who wrote that comment. If there is no number then only one person made that comment. The numbers by comments do not add up to the total number of people in the general response group because many people did not write comments.

People who hoped wolves continue to inhabit the Ninemile Valley (n=76)

Any situation that might make a respondent oppose wolves:
- If wolves were a threat (to people), if confrontations occur, if human population in Ninemile increased 10
- If wolves were reintroduced 3
- Restrictions on timber, grazing, mining 3
- If other wildlife or deer numbers declined 2
- If there are "too many" wolves 2
- Miscellaneous 6

People with no opinion about wolf presence in Ninemile (n=11)

Any situation that might make a respondent oppose wolves:
- Cost to taxpayers 2
- If game numbers go down

People who wish wolves were not present in Ninemile (n=58)

Any situation that might make a respondent favor wolves:
- Nothing 7
- Control (local) of wolves, wolf numbers, wolves on their property 4
- Reimbursement for anything wolf related, no cost to the people (verification of wolf kills not based on agency personnel decision) 6
- If there were no people, pets, or livestock in Ninemile 2
- Miscellaneous 4

APPENDIX 6

'Other' comments to management policy questions.

The number after each comment designates the number of people who wrote that comment. If there is no number then only one person made the comment.

"If a wolf kills pets two or more times in one year, that wolf should be..."

- Do nothing, blame the owner 12
- Do nothing if happens rarely, depends on situation 2
- Owner reimbursed for the pet
- "3 strikes you're out"
- Don't know
- Remove wolf

"If a wolf kills livestock for the first time, that wolf should be..."

- Do nothing 5
- Depends on situation, don't know 2
- "3 strikes you're out"
- #1 and then #2
- Minnesota's program

"If research must be conducted on wolves in Montana, it should be funded by..."

- Don't need research 2
- People who want wolves 4
- People who reintroduced wolves 3
- Researchers
- All three groups
- Multiple-use licenses
- Mining and timber interests (mitigation)

APPENDIX 7

Results of inferential statistical data analysis

Inferential statistics offer insight into patterns of results from a sample which may be applicable to the population from which the sample was selected. Because this project's objectives included surveying the entire population of Ninemile, inferential statistics were not required. However, they can offer greater insight and understanding of the data collected.

In order to apply inferential statistics to data, certain assumptions about that data must be met. The Ninemile resident list, however, was collected based on availability and a random sample was not selected from the list, thus violating an assumption of an analysis of variance, or ANOVA. ANOVA is a robust test and violating an assumption, such as randomness, does not deem its results unreliable (Huck and Cormier 1996). In addition, running a Levene's test, which examines variance dispersion and homogeneity, legitimized the comparison of two means and adds confidence to the results of the ANOVA. Therefore, the results of the ANOVA run on the data are available for use where applicable.

Mean attitude scores and mean fear-of-wolves scores were computed for each group of respondents to a particular answer in a multiple choice or Likert format question. An ANOVA was conducted to examine whether variations in different response groups' mean attitudes or levels of fear were significantly different from one another (Collyer and Enns 1987).

While an ANOVA determines whether significant differences exist among groups, between group differences are not computed. In order to understand where significant differences exist among multiple groups, post hoc tests are required. I used the Schefee test, the most conservative post hoc test available, to provide greater control over the risk of Type I errors (Huck and Cormier 1996).

ANOVA results for comparisons of means by table number

Table	F	df	p<	Response groups*
1	161.0	2,130	0.001	yes: no, no op; no: no op
2	3.631	3,130	0.05	HS grad, coll. grad
3	3.550	3,130	0.05	< 3 yrs, 21-60 yrs
4	4.812	3,130	0.005	more: less, dk
5	27.085	4,131	0.001	SA: N, D, SD; A: D, SD; N: SA, SD
6	10.463	4,129	0.001**	SA: SD; A: D, SD; N: SD
7	13.970	4,130	0.001	SD: SA, A, N, D
8	12.522	3,12	0.05	SD: SA, A
9	32.574	4,131	0.001	SA: A, N, D, SD; A: D, SD
14	12.807	4,126	0.001	SA: A, N, D; A: SA, SD; N: SA
15	51.604	4,128	0.001	SA: A, N, D, SD; A: SA, SD
18	8.410	4,125	0.001	SA: N, D, SD; A: D
20	3.270	4,129	0.05**	SD: N, A

(SA=strongly agree; A=agree; N=neutral; D=disagree; SD=strongly disagree; no op=no opinion; less=less favorable than now, more=more favorable than now, dk=I don't know; hs grad=highschool graduate, coll grad=college graduate)

Notes

*The response groups for each table which had mean attitude or fear scores which differed significantly ($p < 0.05$) from one another based on the results of the Schefee test. For example SA: D, SD would mean that the mean score of the "strongly agree" response group differed significantly from both the "disagree" and "strongly disagree" response groups.

**Although mean scores were significantly different between response groups, the Levene's test exposed the overall variance in these two cases to be significantly ($p < 0.05$) different between the response groups compared in this table, breaking one of the assumptions of the ANOVA for this comparison.

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